# THE
# TUTOR's ASSISTANT:
BEING
## A Compendium of ARITHMETIC;
AND
## A COMPLETE QUESTION-BOOK.

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In FIVE PARTS.

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CONTAINING.

- I. *Arithmetic* in whole Numbers; being a brief Explanation of all its Rules, in a new and more conciſe Method than any hitherto publiſhed; with an *Application* to each Rule, conſiſting of a large Variety of Queſtions in real Buſineſs, with their Anſwers annexed.
- II. *Vulgar Fractions*, which are treated with a great deal of Plainneſs and Perſpicuity.
- III. *Decimals* with the *Extraction* of the *Square*, *Cube*, and *Biquadrate Roots*, after a very plain and Familiar Manner, in which are ſet down *Rules* for the eaſy Calculation of *Intereſt*, *Annuities*, and *Penſions* in *Arrears*, the *preſent Worth* of *Annuities*, &c. either by Simple or Compound Intereſt.
- IV. *Duodecimals* or *Multiplication* of Feet and Inches, with Examples applied to meaſuring, and working by Multiplication, Practice, and Decimals.
- V. A *Collection* of *Queſtions* ſet down promiſcuouſly, for the greater Trial of the foregoing *Rules*.

The whole being adapted either as a QUESTION BOOK for the Uſe of Schools, or as a REMEMBRANCER and INSTRUCTOR to ſuch as have ſome Knowledge therein.

*This Work having been peruſed by ſeveral Eminent* MATHEMATICIANS *and* ACCOMPTANTS, *is recommended as the beſt* COMPENDIUM *hitherto publiſhed for the Uſe of* SCHOOLS, *as well as for* PRIVATE PERSONS.

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The SEVENTH EDITION, *with ſeveral* ADDITIONS, particularly a *New* and very *ſhort Method* of extracting the CUBE ROOT, and a General TABLE for the *ready Calculating* the INTEREST *of any Sum of Money, at any Rate* per Cent. *likewiſe* Rents, Salaries, &c.

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*By* FRANCIS WALKINGAME

WRITING-MASTER and ACCOMPTANT.

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By W. BUNCE, *in Ruſſel-Street, Covent-Garden*;
And ſold by EDWARD JOHNSON, in *Ave-Maria-Lane*,
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in St. *Martin's Lane*, near *Charing-Croſs*.

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# PREFACE.

THE Public, no doubt, will be ſurprized to find there is another Attempt made to publiſh a Book of ARITHMETIC, when there are ſuch Numbers already extant on the ſame Subject, and ſeveral of them that have ſo lately made their Appearance in the World; but I flatter myſelf, that the following Reaſons which induced me to compile it, the Method, and the Conciſeneſs of the Rules, which are laid down in ſo plain and familiar a Manner, will have ſome Weight towards its having a favourable Reception.

Having ſome Time ago drawn up a ſet of Rules, and proper Queſtions, with their Anſwers annexed, for the Uſe of my own School, and divided them into ſeveral Books, as well for the more Eaſe of myſelf, as the readier Improvement of my Scholars, I found them, by Experience, of infinite Uſe; for when a Maſter takes upon him that laborious (though unneceſſary) Method of writing out the Rules and Queſtions in the Children's Books, he muſt either be toiling and ſlaving himſelf, after the Fatigue of the School is over, to get ready the Books for the next Day, or elſe muſt loſe that Time which would be much better ſpent in inſtructing and opening the Minds of his Pupils. There was however ſtill an Inconvenience which hindered them from giving me the Satisfaction I at firſt expected, *i. e.* where there are ſeveral Boys in a Claſs, ſome one or other muſt wait till the Boy who firſt has the Book, finiſhes the writing out thoſe Rules or Queſtions he wants, which detains the others from making that Progreſs they otherwiſe might, had they a proper Book of Rules and Examples for each; to remedy which, I was prompted, to compile one, in order to have it printed, as might not only be of Uſe to my own School, but to ſuch others as would have their Scholars make a quick Progreſs. It will alſo be of great Uſe to ſuch Gentlemen as have acquired ſome Knowledge of Numbers at School, to make them the more perfect; likewiſe to ſuch as have completed themſelves therein, it will prove, after an impartial Peruſal, on Account of its great Variety and Brevity, a moſt agreeable and entertaining Exerciſe Book. I ſhall not preſume to ſay any Thing more in Favour of the Work, but beg Leave to refer the unprejudiced Reader to the Remark of a certain * Author, concerning Compoſitions of this Nature: His Words are as follows:

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* *Dilworth.*

“ And now after all, it is poſſible that ſome who like beſt to tread the old beaten Path, and to ſweat at their Buſineſs, when they may do it with Pleaſure, may ſtart an Objection againſt the Uſe of this well-intended ASSISTANT, becauſe the Courſe of ARITHMETIC is always the ſame, and therefore ſay, *That ſome Boys, lazily inclined, when they ſee another at work upon the ſame Queſtion, will be apt to make his Operation paſs for their own.* But theſe little Forgeries are ſoon detected by the Diligence of the TUTOR : Therefore as different Queſtions to different Boys do not in the leaſt promote their improvement ; ſo neither do the Queſtions hinder it. Neither is it in the Power of any Maſter (in the Courſe of his Buſineſs) how full of Spirits ſoever he be, to frame new Queſtions at Pleaſure, in any Rule, but the ſame Queſtion will frequently occur in the ſame Rule, notwithſtanding his greateſt Care and Skill to the contrary.

“ It may alſo be further objected, *That to teach by a printed Book is an Argument of Ignorance and Incapacity* ; which is no leſs trifling than the former. He indeed (if any ſuch there be) who is afraid his Scholars will improve too faſt, will undoubtedly decry this Method : But that Maſter's Ignorance can never be brought in Queſtion, who can begin and end it readily ; and moſt certainly that Scholar's Non-Improvement can be as little

“ queſtioned, who makes a much greater Pro-
“ greſs by this than by the common Method.”

To enter into a long Detail of every Rule would tire the Reader, and ſwell the Preface to an unuſual Length; therefore ſhall only give a general Idea of the Method of Proceeding, and leave the reſt to ſpeak for itſelf, which I hope the kind Reader will find to anſwer the Title, and the Recommendation given it. As to the Rules, they follow in the ſame Manner as the Table of Contents ſpecifies, and in much the ſame Order as they are generally taught in Schools. I have gone through the four fundamental Rules in Integers firſt, before thoſe of the ſeveral Denominations, in order that they being well underſtood, the latter will be performed with much more Eaſe and Diſpatch, according to the Rules ſhewn, than by the cuſtomary Method of dotting. In Multiplication I have ſhewn both the Beauty and Uſe of that excellent Rule, in reſolving moſt Queſtions that occur in merchandizing, and have prefixed before Reduction, ſeveral Bills of Parcels, which are applicable to real Buſineſs. In working Intereſt by Decimals, I have added Tables to the Rules, for the readier calculating Annuities, *&c.* and have not only ſhewn the Uſe, but the Method of making them. I have alſo added to this *ſeventh Edition* a NEW RULE for extracting the *Cube Root*, being a much ſhorter Way than any that is already publiſhed; as likewiſe an Intereſt-Table calculated for the eaſier finding the Intereſt of any Sum of Money at any Rate *per Cent.* by Multiplication and Addition only, it is alſo uſeful in calculating Rents, Incomes, and Servant's Wages, for any Number of Months, Weeks, or Days; and, I may venture to ſay, I have gone through the Whole with ſo much Plainneſs and Perſpicuity, that there is none now extant that is better.

I have nothing further to add, but to return my ſincere Thanks to all thoſe Gentlemen, School-maſters, and others, for their kind Approbation, and Encouragement given to the former Editions; eſpecially to thoſe who have favoured me with their Remarks; and I muſt ſtill beg of every candid and judicious Reader, that if he ſhould by Chance find a Tranſpoſition of a Letter, or a falſe Figure, to excuſe it; for notwithſtanding there has been great Care taken in correcting, yet Errors of the Preſs will inevitably creep in, and ſome may alſo have ſlipped my Obſervation: In either of which Caſes, the Admonitions of a good-natured Reader will be very acceptable.

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# WRITING,

In all the various Hands now in Uſe;

# ARITHMETIC,

Through all its different Rules;

VULGAR and DECIMAL FRACTIONS

With the EXTRACTION of the

SQUARE and CUBE ROOT;

ALSO

# DUODECIMALS,

Are taught Abroad,

*By* F. WALKINGAME,

In *St. Martin's-Lane*, near *Charing-Croſs*.

Where may be had *The* TUTOR'S ASSISTANT.

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# Explanation *of the* Characters *made uſe of in this* COMPENDIUM.

| | |
|---|---|
| = *Equal.* | The Sign of Equality; as, 4 *qrs.* = 1 *cwt.* ſignifies, that 4 *qrs.* are equal to 1 *cwt.* |
| — *Minus or leſs.* | The Sign of Subtraction; as, 8 — 2 = 6, that is 8 leſſened by 2 is equal to 6. |
| + *Plus or more.* | The Sign of Addition; as, 4 + 4 = 8, that is, 4 add 4 more, is equal to 8. |
| × *Into or with.* | The Sign of Multiplication; as, 4 × 6 = 24, that is, 4 multiplied into 6, is equal to 24, |
| ÷ *By.* | The Sign of Diviſion; as, 8 ÷ 2 = 4, that is, 8 divided by 2 is equal to 4. |
| $\frac{2375}{63}$ | Numbers placed like a Fraction, do likewiſe denote Diviſion; the upper Number being the Dividend, and the lower the Diviſor. |
| : :: *So is.* | The Sign of Proportion; as, 2 : 4 : : 8 : 16, that is, as 2 is to 4 ſo is 8 to 16. |
| $7-2+5=10.$ | Shews that the Difference between 2 and 7 added to 5, is equal to 10. |
| $9-\overline{2+5}=2.$ | Signifies, that the Sum of 2 and 5 taken from 9, is equal to 2. |
| $\sqrt{}$ | Prefixed to any Number, ſignifies the Square Root of that Number is required. |
| $\sqrt[3]{}$ | Signifies the Cube, or third Power. |
| $\sqrt[4]{}$ | Denotes the Biquadrate, or the fourth Power, *&c.* |

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# THE
# TUTOR's ASSISTANT,
## BEING
## A Compendium of Arithmetic:

## PART I.

### *Arithmetic in Whole Numbers.*

### The INTRODUCTION.

ARITHMETIC is the Art or Science of computing by Numbers, and conſiſts both in Theory and Practice.

The Theory conſiders the Nature and Quality of Numbers, and demonſtrates the Reaſon of practical Operations.

The Practice is that which ſhews the Method of working by Numbers, ſo as to be the moſt uſeful and expeditious for Buſineſs, and has five principal or fundamental Rules for the Operations, viz.

Notation or Numeration. Addition, Subtraction, Multiplication, and Diviſion.

### NUMERATION.

TEACHETH the different Value of Figures by their different Places, and to read and write any Sum or Number.

## *The* TABLE.

| C Millions. | X Millions. | Millions. | | C Thouſands. | X Thouſands. | Thouſands. | | Hundreds. | Tens. | Units. |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 8 | 7 | . | 6 | 5 | 4 | . | 3 | 2 | 1 |
| 9 | 0 | 0 | . | 0 | 0 | 0 | . | 0 | 0 | 0 |
| | 8 | 0 | . | 0 | 0 | 0 | . | 0 | 0 | 0 |
| | | 7 | . | 0 | 0 | 0 | . | 0 | 0 | 0 |
| | | | | 6 | 0 | 0 | . | 0 | 0 | 0 |
| | | | | | 5 | 0 | . | 0 | 0 | 0 |
| | | | | | | 4 | . | 0 | 0 | 0 |
| | | | | | | | | 3 | 0 | 0 |
| | | | | | | | | | 2 | 0 |
| | | | | | | | | | | 1 |

RULE. There are three Periods; the firſt on the Right-hand Units, the Second Thouſands, and the Third Millions, each conſiſting of three Figures, or Places. Reckon the firſt Figure of each from the Left hand as ſo many Hundreds; the next as Tens, and the Third as ſo many ſingle Ones of what is wrote over them: As the firſt Period on the Left-hand is read thus, Nine Hundred Eighty-ſeven Millions; and ſo on for any of the reſt.

### *The* APPLICATION.

*Write down in proper Figures the following Numbers.*

Twenty-three.

Two Hundred and Fifty-four.

Three Thouſand, two Hundred and Four.

Twenty-five Thouſand, eight Hundred Fifty-ſix.

One Hundred thirty two Thouſand, two Hundred Forty-five.

Four Millions, nine hundred forty-one Thouſand, four Hundred.

Twenty-ſeven Millions, one hundred fifty-ſeven Thouſand, eight Hundred thirty-two.

Seven hundred twenty two Millions, two hundred thirty-one Thouſand, five Hundred and Four.

Six hundred two Millions, two hundred ten Thouſand, five Hundred.

*Write down in words at Length the following Numbers.*

| | | | | |
|---|---|---|---|---|
| 35 | 2017 | 519007 | 5207054 | 65700047 |
| 59 | 5201 | 750058 | 2071906 | 900062057 |
| 173 | 20760 | 5900030 | 70054008 | 201900760 |

*Notation by* ROMAN *Letters*

I One.
II Two.
III Three.
IV Four.
V Five.
VI Six.
VII Seven.
VIII Eight.
IX Nine.
X Ten.
XI Eleven.
XII Twelve.
XIII Thirteen.
XIV Fourteen.
XV Fifteen.
XVI Sixteen.
XVII Seventeen.
XVIII Eighteen.
XIX Nineteen.
XX Twenty.
XXX Thirty.
XL Forty.
L Fifty.
LX Sixty.
LXX Seventy.
LXXX Eighty.
XC Ninety.
C Hundred.
CC Two Hundred.
CCC Three Hundred.
CCCC Four Hundred.
D Five Hundred.
DC Six Hundred.
DCC Seven Hundred.
DCCC Eight Hundred.
DCCCC Nine Hundred.
M One Thouſand.
MDCCLXVIII One Thouſand Seven Hundred and Sixty-eight.

# INTEGERS.

## ADDITION.

TEACHETH to add two or more Sums together, to make one whole or total Sum.

RULE. There muſt be due Regard had in placing your Figures one under the other, *i. e.* Units under Units, Tens under Tens, *&c.* then beginning with the firſt row of Units, add them up to the Top; when done, ſet down the Units, and carry the Tens to the next, and ſo on; continuing to the laſt Row, at which ſet down the total Amount.

PROOF. Begin at the Top of the Sum, and reckon the Figures downwards, the ſame as you added them up, and, if the ſame as the Firſt, the Sum is ſuppoſed to be right.

## Addition *and* Subtraction TABLE.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 4 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 7 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 9 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

| £. | *Cwt.* | *Qrs.* | *Months.* | £. | *Years.* |
|---|---|---|---|---|---|
| 2 | 27 | 275 | 1234 | 7524 | 27104 |
| 5 | 35 | 110 | 7098 | 3750 | 32547 |
| 7 | 47 | 473 | 3214 | 9147 | 10738 |
| 9 | 35 | 354 | 6732 | 3214 | 62390 |
| 2 | 41 | 271 | 2546 | 4725 | 75408 |
| 5 | 36 | 352 | 3709 | 2147 | 27973 |
| 4 | 59 | 471 | 4152 | 3254 | 85421 |
| 3 | 37 | 310 | 3705 | 2716 | 12706 |
| 7 | 14 | 473 | 1076 | 1047 | 10471 |
| 44 | 331 | | | | |

## SUBTRACTION.

TEACHETH to take a leſſer Number from a greater, and ſhews the Remainder, or Difference.

Rule. This being the Reverſe of Addition, you muſt borrow here (if it requires) what you ſtopped at there, always remembering to pay it to the next.

Proof. Add the Remainder and leſſer Line together, and, if the ſame as the greater, it is right

| | £. | *Hund.* | *Hours.* | *Weeks.* | *Hogds.* | *Minutes.* |
|---|---|---|---|---|---|---|
| *From* | 271 | 3754 | 42087 | 452705 | 271508 | 3750214 |
| *Take* | 154 | 2725 | 35096 | 327616 | 152471 | 2150873 |
| *Rem.* | 117 | | | | | |
| *Proof.* | 271 | | | | | |

# MULTIPLICATION.

TEACHETH how to encreaſe the greater of two Numbers given, as often as there are Units in the leſſer; and compendiouſly performs the Office of many Additions.

To this Rule belong three principal Members, viz.

1. The Multiplicand, or Number to be multiplied.
2. The Multiplier, or Number by which you multiply.
3. The Product, or Number produced by multiplying.

RULE. Begin with that Figure that ſtands in the Units Place of the Multiplier, and with it multiply the firſt Figure in the Units Place of the Multiplicand. Set down the Units, and carry the Tens in Mind, till you have multiplied the next Figure in the Multiplicand by the ſame Figure in the Multiplier; to the Product of which add the Tens you kept in Mind, ſetting down the Units, and proceed as before, till the whole Line is multiplied.

PROOF. The uſual Way of proving Multiplication is, by caſting out the Nines from the Multiplicand and Multiplier; the Remainders put on each Side of a Croſs: Multiply the Figures on each Side together, caſt the Nines from the Product, and put the Overplus at Top; then caſt out the Nines from the Product of the Multiplication, and its Remainder place at the Bottom; and if it agrees with the Top, the Work is ſuppoſed right. But the ſureſt Way is, to divide the Product by the Multiplicand, and the Quotient will be the ſame as the Multiplier.

## MULTIPLICATION *and* DIVISION TABLE.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

| | | | |
|---|---|---|---|
| *Multiplicand* | 25104736 | 52471021 | 7925437521 |
| *Multiplier* | 2 | 3 | 4 |
| *Product* | 50209472 | | |

| | | | |
|---|---|---|---|
| 27104107 | 231047 | 7092516 | 3725104 |
| 5 | 6 | 7 | 8 |
| | | | |
| 3215406 | 2701047 | 31040871 | 35210472 |
| 9 | 11 | 12 | 12 |

When the Multiplier is more then 12, and leſs then 20, multiply by the Unit Figure in the Multiplier, adding to the Product the back Figure to that you multiplied.

| | | | |
|---|---|---|---|
| 5710592 | 5107252 | 7653210 | 92057165 |
| 13 | 14 | 15 | 16 |
| | | | |
| 6251721 | 9215324 | 2571041 | 3592104 |
| 17 | 18 | 19 | 19 |

When the Multiplier conſiſts of ſeveral Figures, there muſt be as many Products as there are Figures in the Multiplier, obſerving to put the firſt Figure of every Product under that Figure you multiplied by. Add the ſeveral Products together, and their Sum will be the total Product.

| | | | | |
|---|---|---|---|---|
| 0<br>6 + 0<br>0 | 271641 | 32104 | 2710432 | 27501976 |
| | 27 | 25 | 375 | 271 |
| | 1897287<br>542082 | 802620 | 1016412000 | 7453035496 |
| | 7318107 | | | |

When Cyphers are placed between the ſignificant Figures in the Multiplier, they may be omitted, but great Care muſt be taken that the next Figure muſt be put one Place more to the Left-hand, *i. e.* under the Figure you multiply by.

571204

| | | |
|---|---|---|
| 571204 | 7104325 | 5271094 |
| 27009 | 57020 | 590000 |
| 15427648836 | 405088611500 | 3110133592820 |

When there are Cyphers at the End of the Multiplicand or Multiplier, they may be omitted, by only multiplying by the reſt of the Figures, and ſetting down on the Right-hand of the total Product as many Cyphers as were omitted.

| | | | |
|---|---|---|---|
| 27100 | 379500 | 265000 | 574000 |
| 52600 | 274000 | 7200 | 630 |
| 1425460000 | 103983000000 | 1908000000 | 361620000 |

When the Multiplier is a compoſite Number, *i. e.* if any two Figures, being multiplied together, will make that Number, then multiply by one of thoſe Figures, and that Product by the other will give the Anſwer.

| | | |
|---|---|---|
| 571039 by 35 | 921563 by 32 | 715241 by 56 |
| 19986365 | 29490016 | 40053496 |

## DIVISION.

TEACHETH us to find how often one Number is contained in another; or to divide any Number into what Parts you pleaſe.

In this Rule there are three Numbers real, and a fourth accidental, *viz.*

1. The Dividend, or Number to be divided.
2. The Diviſor, or Number by which you divide.
3. The Quotient, or Number that ſhews how often the Diviſor is contained in the Dividend.

4th, or accidental Number, is what remains when the Work is finiſhed, and is of the ſame Name as the Dividend.

RULE. When the Diviſor is leſs than 12, find how often it is contained in the firſt Figure of the Dividend; ſet it down under the Figure you divided, and carry the Overplus (if any) to the next in the Dividend, as ſo many Tens; then find how often the Diviſor is contained therein, ſet it down, and continue the ſame till you have gone through the Line: But when the Diviſor is more than 12, multiply it by the Quotient Figure; the Product ſubtract from the Dividend, and to the Remainder bring down the next Figure in the Dividend, and proceed as before, till the Figures are all brought down.

PROOF. Multiply the Diviſor and Quotient together, adding the Remainder (if any) and the Product will be the ſame as the Dividend.

Dividend Rem.
Diviſor 2)725107(1
Quotient 362553
2
Proof 725107

3)7210472(

4)7210416(

5)7203287(

6)5231047(

7)2532701(

8)2547325(

9)250473o6(

11)2750012(

11)2710513(

12)72100732(

Diviſor Dividend Quotient
27)3210473(118906 27
27
51 832342
27 237812
240 11
216 3210473 Proof
244
243
173
162
Rem. 11

35)7210473(206013
473)2104721(4449
275)3720147(13527
3701)7210952 1(19483
3576)72104725(20163
2510)63210476(25183
25204)321047217(12737
31709)521047321(16432
2701234)7210472532(2669
210472)352107193214(1672940
3721071)21071921473(5662

When there are Cyphers at the End of the Diviſor, they may be cut off, and as many Places off of the Dividend, but muſt be annexed to the Remainder at laſt.

271|00)254732|21(939 5721|00)7253472|16(1267
375|000)752473|719(2006 215|000)6325104|997(29419

When the Diviſor is a compoſite Number, *i. e.* if any two Figures, being multiplied together, will make that Number; then divide the Dividend by one of thoſe Figures, and that Quotient by the other, it will give the Quotient required.—But as it ſometimes happens, that there is a Remainder to each of the Quotients, and neither of them the true one, it may be found by this

RULE. Multiply the firſt Diviſor into the laſt Remainder, to that Product add the firſt Remainder, which will give the true one,

| Div. 3210473 by 27 | 7210473 by 35 | 6251043 by 42 | 5761034 by 54 |
|---|---|---|---|
| 118906.11 Rem. | 206013.18 Rem. | 148834.15 Rem. | 106685.44 Rem. |

## TABLES *of* MONEY, WEIGHTS, *and* MEASURES.

### MONEY.

| Marked | | | | | Marked |
|---|---|---|---|---|---|
| ¼ *Farthing.* | 4 Farthings | – make | 1 Penny. | – | *d.* |
| ½ *Halfpenny.* | 12 Pence | – – – – – – | 1 Shilling | – | *s.* |
| ¾ *Three Farthings.* | 20 Shillings | – – – – | 1 Pound. | – | *l.* |

Farthings.
4 = 1 Penny.
48 = 12 = 1 Shilling.
960 = 240 = 20 = 1 Pound.

### TROY WEIGHT.

| | | | | Marked |
|---|---|---|---|---|
| 24 Grains | – – make – – | 1 Pennyweight. | – – | *grs.*<br>*dwts.* |
| 20 Pennyweights | – – – – | 1 Ounce. | – – – – – | *oz.* |
| 12 Ounces | – – – – – – – – | 1 Pound. | – – – – – – | *lb.* |

Grains.
24 = 1 Pennyweight.
480 = 20 = 1 Ounce.
5760 = 240 = 12 = 1 Pound.

By this Weight are weighed Gold, Silver, Jewels, Electuaries, and all Liquors.

*N. B.* The Standard for Gold Coin is 22 Carats of fine Gold, and 2 Carats of Copper melted together. For Silver is 11 *oz.* 2 *dwts.* of fine Silver, and 18 *dwts* of Copper.

25 *lb.* is a Quarter of an *cwt.* 100 *lb.* 1 *cwt.* 20 *cwt.* 1 Ton of Gold or Silver.

## AVOIRDUPOISE WEIGHT.

| | | | Marked |
|---|---|---|---|
| 16 Drams | make | 1 Ounce. | *dr.*<br>*oz.* |
| 16 Ounces | | 1 Pound. | *lb.* |
| 28 Pounds | | 1 Quarter. | *qrs.* |
| 4 Quarters, or 112 *lb.* | | 1 Hundred Weight. | *cwt.* |
| 20 Hundred Weight | | 1 Ton. | *Ton.* |

Drams.
16 = 1 Ounce.
256 = 16 = 1 Pound.
7168 = 448 = 28 = 1 Quarter.
28672 = 1792 = 112 = 4 = 1 Hundred Weight.
573440 = 35840 = 2240 = 80 = 20 = 1 Ton.

There are ſeveral other Denominations in this Weight. that are uſed in ſome particular Goods, *viz.*

| | *lb.* | | *lb.* |
|---|---|---|---|
| A Firkin of Butter | 56 | A Stone of Iron Shot, or Horſeman's wt. | 14 |
| Soap | 64 | | |
| A Barrel of Anchovies | 30 | Butchers Meat | 8 |
| Soap | 256 | A Gallon of Train Oil | $7\frac{1}{2}$ |
| Raiſins | 112 | A Truſs of Straw | 36 |
| A Puncheon of Prunes | 1120 | New Hay | 60 |
| A Fother of Lead, 19 *cwt.* 2 *qrs.* | | Old Hay | 56 |
| | | 36 Truſſes a Load. | |

*Cheeſe and Butter.*

A Clove, or Half Stone, 8 *lb.*

| | *lb.* | | *lb.* |
|---|---|---|---|
| A Wey in Suffolk, 32 Cloves, or | 256 | A Wey in Eſſex 42 Cloves, or | 336 |

*Wool.*

| | *lb.* | | *lb.* |
|---|---|---|---|
| A Clove | 7 | A Wey is 6 Tod and 1 Stone, or | 182 |
| A Stone | 14 | A Sack is 2 Weys, or | 364 |
| A Tod | 28 | A Laſt is 12 Sacks, or | 4368 |

By this Weight is weighed any thing of a coarſe or droſſy Nature ; as all Grocery and Chandlery Wares ; Bread and all Metals but Silver and Gold.

*Note*, 1 Pound Avoirdupoiſe is equal to 14 *oz.* 11 *dwts.* 15 *gr.* ½ Troy.

## APOTHECARIES WEIGHT.

| | | Marked |
|---|---|---|
| 20 Grains - make - | 1 Scruple. - - - | ℈ |
| 3 Scruples - - - - - | 1 Dram. . - - - | ʒ |
| 8 Drams - - - - - - | 1 Ounce. - - - | ℥ |
| 12 Ounces - - - - - - | 1 Pound. - - - | ℔ |

Grains.
20 = 1 Scruple.
60 = 3 = 1 Dram.
480 = 24 = 8 = 1 Ounce.
5760 = 288 = 96 = 12 = 1 Pound.

*Note*, The Apothecaries mix their Medicines by this Rule, but buy and ſell their Commodities by Avoirdupoiſe Weight.

The Apothecaries Pound and Ounce, and the Pound and Ounce Troy are the ſame, only differently divided and ſubdivided.

## CLOTH MEASURE.

| | | Marked |
|---|---|---|
| 4 Nails - make - | 1 Quarter of a Yard. | *n.*<br>*qrs.* |
| 3 Quarters - - - - | 1 Ell Flemiſh. - - - - - | *E. F.* |
| 4 Quarters - - - - | 1 Yard. - - - - - - - - - | *yd.* |
| 5 Quarters - - - - | 1 Ell Engliſh. - - - - - | *E. E.* |
| 6 Quarters - - - - | 1 French Aulne. - - - - | *F. A.* |

Inches.
2¼ = 1 Nail.
9 = 4 = 1 Quarter.
36 = 16 = 4 = 1 Yard.
27 = 12 = 3 = 1 Ell Flemiſh.
45 = 20 = 5 = 1 Ell Engliſh.

LONG

## LONG MEASURE.

| | | | Marked |
|---|---|---|---|
| 3 | Barley-Corns - make - | 1 Inch. | *bar.*<br>*in.* |
| 12 | Inches | 1 Foot. | *feet.* |
| 3 | Feet | 1 Yard. | *yd.* |
| 6 | Feet | 1 Fathom. | *fath.* |
| 5½ | Yards | 1 Rod, Pole, or Perch. | *rod.p.* |
| 40 | Poles | 1 Furlong. | *fur.* |
| 8 | Furlongs | 1 Mile. | *mile.* |
| 3 | Miles | 1 League. | *lea.* |
| 60 | Miles | 1 Degree. | *deg.* |

Barley-Corns.
3 = 1 Inch.
36 = 12 = 1 Foot.
108 = 36 = 3 = 1 Yard.
594 = 198 = 16½ = 5½ = 1 Pole.
23760 = 7920 = 660 = 220 = 40 = 1 Furlong.
190080 = 63360 = 5280 = 1760 = 320 = 8 = 1 Mile.

*N. B.* A Degree is 69 Miles, 4 Furlongs, very near, tho' commonly reckoned but 60 Miles.

This Rule is uſed to meaſure Diſtance of Places, or any Thing elſe that has Length only.

## WINE MEASURE.

| | | | Marked |
|---|---|---|---|
| 2 | Pints - - - make | 1 Quart. | *pt.*<br>*qts.* |
| 4 | Quarts | 1 Gallon. | *gal.* |
| 10 | Gallons | 1 Anchor of Brandy. | *anc.* |
| 18 | Gallons | 1 Runlet. | *run.* |
| 31½ | Gallons | Half an Hogſhead. | ½ *hhd.* |
| 42 | Gallons | 1 Tierce. | *tierce.* |
| 63 | Gallons | 1 Hogſhead. | *hhd.* |
| 2 | Hogſheads | 1 Pipe, or Butt. | *P.* or *Butt.* |
| 2 | Pipes, or 4 Hogſheads | 1 Tun. | *tun.* |

Inches

Cubic Inches.

$28\frac{7}{8}$ = 1 Pint.
$57\frac{3}{4}$ = 2 = 1 Quart.
231 = 8 = 4 = 1 Gallon.
9702 = 336 = 168 = 42 = 1 Tierce.
14553 = 504 = 252 = 63 = $1\frac{1}{2}$ = 1 Hogſhead.
19404 = 672 = 336 = 84 = 2 = $1\frac{1}{3}$ = 1 Puncheon.
29106 = 1008 = 504 = 126 = 3 = 2 = $1\frac{1}{2}$ = 1 Pipe.
58212 = 2106 = 1008 = 252 = 6 = 4 = 3 = 2 = 1 Tun.

All Brandies, Spirits, Perry, Cyder, Mead, Vinegar, Honey and Oil, are meaſured by this Meaſure; as alſo Milk: Not by Law but Cuſtom only.

## ALE *and* BEER MEASURE.

| | | | Marked |
|---|---|---|---|
| 2 Pints | make | 1 Quart. | *pts.*<br>*qts.* |
| 4 Quarts | | 1 Gallon. | *gal.* |
| 8 Gallons | | 1 Firkin of Ale. | *A. fir.* |
| 9 Gallons | | 1 Firkin of Beer. | *B. fir.* |
| 2 Firkins | | 1 Kilderkin. | *Kil.* |
| 4 Firkins, or 2 Kilderkins | | 1 Barrel. | *Bar.* |
| 1 Barrel and ½, or 54 Gallons | | 1 Hogſhead of Beer. | *hhd.* |
| 3 Barrels, or 2 Hogſheads | | 1 Butt. | *Butt.* |

### BEER.

Cubic Inches.

$35\frac{1}{4}$ = 1 Pint.
$70\frac{1}{2}$ = 2 = 1 Quart.
282 = 8 = 4 = 1 Gallon.
2538 = 72 = 36 = 9 = 1 Firkin.
5076 = 141 = 72 = 18 = 2 = 1 Kilderkin.
10152 = 283 = 144 = 36 = 4 = 2 = 1 Barrel.
15228 = 432 = 216 = 54 = 6 = 3 = $1\frac{1}{2}$ = Hogſhead.
30456 = 864 = 432 = 108 = 12 = 6 = 3 = 2 = 1 Butt.

### ALE.

Cubic Inches.

$35\frac{1}{4}$ = 1 Pint,
$70\frac{1}{2}$ = 2 = 1 Quart.
282 = 8 = 4 = 1 Gallon.
2256 = 64 = 32 = 8 = 1 Firkin.
4512 = 128 = 64 = 16 = 2 = 1 Kilderkin.
9024 = 256 = 128 = 32 = 4 = 2 = 1 Barrel.
13536 = 384 = 192 = 48 = 6 = 3 = $1\frac{1}{2}$ = 1 Hogſhead.

In *London* they conpute but 8 Gallons to the Firkin of Ale, and 32 to the Barrel; but in all other Parts of *England*, for Ale, Strong Beer, and Small, 34 Gallons to the Barrel, and 8 Gallons and ½ to the Firkin.

| | | |
|---|---|---|
| *N. B.* | A Barrel of Salmon, or Eels, is | 42 Gallons. |
| | A Barrel of Herrings - - - - - | 32 Gallons. |
| | A Keg of Sturgeon - - - - - - - | 4 or 5 Gallons. |
| | A Firkin of Soap - - - - - - - - - | 8 Gallons. |

## DRY MEASURE.

| | | | | | Marked |
|---|---|---|---|---|---|
| 2 | Pints - - - make - - | 1 | Quart. - - | | *pts.*<br>*qts.* |
| 2 | Quarts - - - - - - - - - | 1 | Pottle. - - - - | | *pot.* |
| 2 | Pottles - - - - - - - - - | 1 | Gallon. - - - - | | *gal.* |
| 2 | Gallons - - - - - - - - | 1 | Peck. - - - - - | | *pk.* |
| 4 | Pecks - - - - - - - - - | 1 | Buſhel. - - - - | | *bu.* |
| 2 | Buſhels - - - - - - - - | 1 | Strike. - - - - - | | *ſtrike.* |
| 4 | Buſhels - - - - - - - - | 1 | Coom. - - - - - | | *coom.* |
| 2 | Cooms, or 8 Buſhel | 1 | Quarter. - - - | | *qr.* |
| 4 | Quarters - - - - - - - | 1 | Chaldron. - - - | | *chal.* |
| 5 | Quarters - - - - - - - | 1 | Wey. - - - - - - | | *wey.* |
| 2 | Weys - - - - - - - - - | 1 | Laſt. - - - - - | | *laſt.* |

In *London* 36 Buſhels makes a Chaldron.

Solid Inches.

$268\frac{4}{5}$ = 1 Gallon.

$537\frac{3}{5}$ = 2 = 1 Peck.

$2150\frac{2}{5}$ = 8 = 4 = 1 Buſhel.

$4300\frac{4}{5}$ = 16 = 8 = 2 = 1 Strike.

$8601\frac{3}{5}$ = 32 = 16 = 4 = 2 = 1 Coom.

$17203\frac{1}{5}$ = 64 = 32 = 8 = 4 = 2 = 1 Quarter.

86016 = 320 = 160 = 40 = 20 = 10 = 5 = 1 Wey.

172032 = 640 = 320 = 80 = 40 = 20 = 10 = 2 = 1 Laſt

The Buſhel in *Water Meaſure* is 5 Pecks.
A Score of Coals is 21 Chaldron.
A Sack of Coals - - 3 Buſhels.
A Load of Corn - - 5 Buſhels.
A Cart Load ditto - 40 Buſhels.

This Meaſure is applied to all dry Goods.

* The Standard Buſhel is 18 Inches and ½ wide, and 8 Inch deep.

TIME

## TIME.

| | | | | Marked |
|---|---|---|---|---|
| 60 | Seconds – – make – – | 1 | Minute. – – – – | ′<br>*m.* |
| 60 | Minutes – – – – – – – – – | 1 | Hour. – – – – – – – – | *hour.* |
| 24 | Hours – – – – – – – – – – | 1 | Day. – – – – – – – – | *day.* |
| 7 | Days – – – – – – – – – – – | 1 | Week. – – – – – – – | *week.* |
| 4 | Weeks – – – – – – – – – – | 1 | Month – – – – – – – | *mo.* |
| 13 | Months, 1 Day, 6 Hours, | 1 | Julian Year. – – – – | *yr.* |

Seconds

60 = 1 Minute.

3600 = 60 = 1 Hour.

86400 = 1440 = 24 = 1 Day.

604800 = 10080 = 168 = 7 = 1 Week.

2419200 = 40320 = 672 = 28 = 4 = 1 Month.

31557600 = 525960 = 8766 = $365.\overset{h}{6}$ = $52.\overset{d}{1}.\overset{h}{6}$ = 1 Julian Yr.

31556937 = 525948 = 8765 = $365.\overset{h}{5}.\overset{m}{48}.\overset{\prime\prime}{57}$ = 1 Solar Year.

**To know the Days in each Month, obſerve.**

*Thirty Days hath* September,
April, June *and* November,
February *hath twenty-eight alone,*
*All the reſt hath thirty and one;*
*Except in* Leap Year, *and then's the Time*
February's *Days are twenty and nine.*

## SQUARE MEASURE.

| | | | |
|---|---|---|---|
| 144 | Inches – – – – make – – – – – – | 1 | Foot. |
| 9 | Feet – – – – – – – – – – – – – – – – – – | 1 | Yard. |
| 100 | Feet – – – – – – – – – – – – – – – – – – | 1 | Square of Flooring. |
| 272¼ | Feet – – – – – – – – – – – – – – – – – – | 1 | Rod. |
| 40 | Rods – – – – – – – – – – – – – – – – – – | 1 | Rood. |
| 4 | Roods, or 160 Rods, or 4840 Yards | 1 | Acre of Land. |
| 640 | Acres – – – – – – – – – – – – – – – – – | 1 | Square Mile. |
| 30 | Acres – – – – – – – – – – – – – – – – – | 1 | Yard of Land. |
| 100 | Acres – – – – – – – – – – – – – – – – – | 1 | Hide of Land. |

Inches.
144 = 1 Foot.
1296 = 9 = 1 Yard.
39204 = 272¼ = 30¼ = 1 Pole.
1568160 = 10890 = 1210 = 40 = 1 Rod.
6272640 = 43560 = 4840 = 160 = 4 = 1 Acre.

By this Meaſure are meaſured all Things that have Length and Breadth; ſuch as Land, Painting, Plaiſtering, Flooring, Thatching, Plumbing, Glazing, *&c.*

## SOLID MEASURE.

1728 Inches make - - 1 Solid Foot.
27 Feet - - - - - - - - 1 Yard, or Load of Earth.
40 Feet of Round Timber, } is 1 Ton, or Load.
*Or*, 50 Feet of Hewn Timber }

108 Solid Feet, *i. e.* 12 Feet in Length, 3 Feet in Breadth, and 3 deep; or, commonly, 14 Feet long, 3 Feet 1 Inch broad, and 3 Feet 1 Inch deep, is a Stack of Wood.

128 Solid Feet, *i. e.* 8 Feet long, 4 Feet broad, and 4 Feet deep, is a Cord of Wood.

By this Meaſure are meaſured all Things that have Length, Breadth and Depth.

## ADDITION *of* MONEY, WEIGHTS, *and* MEASURES.

RULE. Add the firſt Row or Denomination together; as in Integers; then divide the Sum by as many of the ſame Denomination as make one of the next greater, ſetting down the Remainder under the Row added, and carry the Quotient to the next ſuperior Denomination, continuing the ſame to the laſt, which add as in ſimple Addition.

PROOF. As in Integers.

### M O N E Y.

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 13 | 5½ | 27 | 7 | 1 | 35 | 17 | 3 | 75 | 3 | 7 |
| 7 | 9 | 4¼ | 35 | 14 | 7¼ | 59 | 14 | 7½ | 54 | 17 | 1½ |
| 5 | 15 | 4½ | 57 | 19 | 2¼ | 97 | 13 | 5¼ | 91 | 15 | 4¼ |
| 9 | 17 | 6¼ | 91 | 16 | 1 | 35 | 16 | 8¼ | 35 | 16 | 5¾ |
| 7 | 16 | 3 | 75 | 18 | 7¾ | 97 | 15 | 7 | 27 | 19 | 7¼ |
| 5 | 14 | 7¾ | 97 | 13 | 5 | 59 | 16 | 5½ | 91 | 17 | 3½ |
| 39 | 6 | 7¼ | | | | | | | | | |

## MONEY.

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 257 | 1 | 4¼ | 525 | 2 | 4¼ | 21 | 14 | 7¼ | 73 | 2 | 1½ |
| 704 | 3 | 7¾ | 179 | 3 | 5 | 75 | 16 | 3 | 25 | 12 | 7 |
| 595 | 5 | 3 | 350 | 4 | 7¼ | 79 | 2 | 4¼ | 96 | 13 | 5½ |
| 059 | 13 | 7½ | 975 | 3 | 5¼ | 57 | 16 | 5½ | 76 | 17 | 3¼ |
| 207 | 5 | 4 | 254 | 5 | 7 | 26 | 13 | 8¾ | 97 | 14 | 1 |
| 708 | 16 | 7¾ | 379 | 4 | 5¾ | 54 | 2 | 7 | 54 | 13 | 7¾ |

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 172 | 4 | 7¼ | 251 | 17 | 1¼ | 25 | 1 | 1½ | 27 | 13 | 5 |
| 325 | 3 | 5 | 379 | 13 | 5 | 76 | 13 | 1 | 15 | 7 | 9¼ |
| 271 | 0 | 7¾ | 257 | 16 | 7¾ | 35 | 19 | 7¼ | 9 | 15 | 3 |
| 524 | 9 | 1 | 184 | 13 | 5 | 97 | 17 | 3¼ | 15 | 2 | 7¼ |
| 379 | 4 | 3¼ | 795 | 2 | 7¼ | 35 | 13 | 5 | 37 | 19 | 1 |
| 215 | 5 | 9¾ | 359 | 16 | 5¼ | 27 | 16 | 3 | 56 | 13 | 7¼ |

## TROY WEIGHT.

| oz. | dwt. | gr. | oz. | dwt. | gr. | lb. | oz. | dwt. | lb. | oz. | dwt. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 15 | 21 | 5 | 11 | 4 | 7 | 1 | 2 | 5 | 2 | 15 |
| 3 | 17 | 6 | 7 | 19 | 21 | 3 | 2 | 17 | 3 | 11 | 17 |
| 2 | 5 | 14 | 3 | 15 | 14 | 5 | 1 | 15 | 9 | 7 | 15 |
| 3 | 16 | 19 | 7 | 19 | 22 | 7 | 10 | 11 | 4 | 5 | 13 |
| 9 | 18 | 23 | 9 | 18 | 15 | 2 | 7 | 14 | 3 | 9 | 7 |
| 7 | 15 | 14 | 8 | 13 | 12 | 3 | 11 | 18 | 5 | 2 | 15 |

## AVOIRDUPOISE WEIGHT.

| lb. | oz. | dr. | lb. | oz | dr. | cwt. | qrs. | lb. | T. | cwt. | qrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 159 | 15 | 15 | 17 | 12 | 3 | 25 | 1 | 17 | 7 | 17 | 2 |
| 272 | 14 | 10 | 23 | 15 | 6 | 79 | 3 | 26 | 5 | 5 | 3 |
| 303 | 15 | 11 | 31 | 11 | 14 | 54 | 1 | 16 | 2 | 4 | — |
| 255 | 10 | 4 | 97 | — | 9 | 25 | 3 | 16 | 3 | 18 | 2 |
| 973 | 6 | 2 | 48 | 7 | 15 | 37 | — | 19 | 7 | 9 | 3 |
| 635 | 13 | 14 | 79 | 10 | 6 | 55 | 2 | 16 | 8 | 5 | 1 |

## APOTHECARIES WEIGHT.

| ʒ | ℈ | *gr.* | ℥ | ʒ | ℈ | *gr.* | *lb.* | ℥ | ʒ | ℈ | *lb.* | ℥ | ʒ | ℈ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 1 | 17 | 9 | 2 | – | 17 | 7 | 10 | 7 | 1 | 7 | 2 | 1 | – |
| 3 | – | 18 | 3 | 5 | 2 | 19 | 9 | 5 | 2 | 2 | 3 | 1 | 7 | 1 |
| 6 | 2 | 16 | 9 | 2 | 1 | 14 | 7 | 11 | 1 | 2 | 9 | 10 | 2 | – |
| 5 | 1 | 15 | 3 | 5 | – | 18 | 9 | 5 | 6 | 1 | 7 | 5 | 7 | 1 |
| 7 | – | 18 | 7 | 7 | 2 | 15 | 7 | 10 | 5 | 2 | 3 | 9 | 5 | 2 |
| 3 | 1 | 5 | 9 | 3 | – | — | 9 | — | 3 | – | 7 | 1 | 4 | 1 |

## CLOTH MEASURE.

| *F F.* | *qrs.* | *n.* | *yds.* | *qrs.* | *n.* | *yds.* | *qrs.* | *n.* | *E.E.* | *qrs.* | *n.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 2 | 1 | 35 | 3 | 2 | 75 | 3 | 1 | 76 | 4 | 1 |
| 15 | 1 | 3 | 76 | 2 | 3 | 97 | 1 | 3 | 52 | 1 | 2 |
| 37 | – | 2 | 95 | 3 | – | 54 | – | 2 | 79 | – | 1 |
| 52 | 1 | 3 | 76 | 1 | 3 | 76 | 2 | – | 56 | 2 | – |
| 76 | 2 | 1 | 26 | – | 1 | 59 | 1 | 3 | 79 | 3 | 1 |
| 97 | 1 | 3 | 79 | 2 | 1 | 76 | 2 | 1 | 54 | 2 | 1 |

## LONG MEASURE.

| *feet.* | *in.* | *bar.* | *yds.* | *f.* | *in.* | *m.* | *fur.* | *p.* | *lea.* | *m.* | *fur.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 9 | 2 | 25 | 1 | 9 | 35 | 7 | 3 | 72 | 2 | 1 |
| 35 | 10 | 1 | 71 | – | 3 | 27 | 5 | 27 | 27 | 1 | 7 |
| 17 | 2 | 2 | 52 | 1 | 2 | 52 | – | 35 | 35 | 2 | 5 |
| 35 | 11 | 1 | 97 | – | 10 | 97 | 1 | 17 | 79 | – | 6 |
| 97 | 2 | 2 | 54 | 2 | 7 | 56 | 7 | 18 | 51 | 1 | 6 |
| 54 | 8 | 1 | 37 | 1 | 4 | 91 | 5 | 27 | 72 | – | 5 |

## LAND MEASURE.

| *a.* | *r.* | *p.* | *a.* | *r.* | *p.* | *a.* | *r.* | *p.* | *a.* | *r.* | *p.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 3 | 27 | 27 | 1 | 35 | 26 | 1 | 31 | 32 | 1 | 14 |
| 36 | 2 | 15 | 29 | 2 | 16 | 19 | 2 | 17 | 27 | – | 16 |
| 97 | 1 | 16 | 37 | 1 | 1[illegible] | 55 | 1 | 14 | 31 | 2 | 15 |
| 35 | 2 | 15 | 95 | 2 | 27 | 79 | 3 | 21 | 19 | 1 | 18 |
| 27 | 1 | 14 | 62 | – | 13 | 95 | 2 | 14 | 36 | 2 | 37 |

## WINE MEASURE.

| *run.* | *gal.* | *qts.* | *tier.* | *gal.* | *qts.* | *hhds.* | *gal.* | *qts.* | *T.* | *hhds.* | *gal.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 17 | 2 | 25 | 36 | 2 | 31 | 57 | 1 | 14 | 3 | 27 |
| 35 | 15 | 3 | 75 | 41 | 3 | 97 | 18 | 2 | 19 | 2 | 56 |
| 56 | 14 | 1 | 62 | 15 | 1 | 76 | 13 | 1 | 17 | – | 39 |
| 97 | 10 | 3 | 97 | 13 | – | 55 | 46 | 2 | 75 | 2 | 16 |
| 92 | 15 | – | 15 | 14 | 1 | 87 | 38 | 3 | 54 | 1 | 19 |
| 79 | 2 | 1 | 19 | 17 | 2 | 54 | 17 | 1 | 97 | 3 | 54 |

## ALE *and* BEER MEASURE.

| *A.B* | *fir.* | *gal.* | *B.B.* | *fir.* | *gal.* | *hhd.* | *gal.* | *qt.* | *hhd.* | *gal.* | *qt.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 2 | 7 | 37 | 2 | 8 | 76 | 51 | 2 | 76 | 2 | 1 |
| 17 | 3 | 5 | 54 | 1 | 7 | 57 | 3 | 3 | 95 | 34 | 2 |
| 96 | 2 | 6 | 97 | 3 | 8 | 97 | 27 | 3 | 57 | 16 | 3 |
| 75 | 1 | 4 | 78 | 2 | 5 | 54 | 17 | 2 | 21 | 14 | 1 |
| 96 | 3 | 7 | 47 | – | 7 | 97 | 16 | 3 | 32 | 37 | 3 |
| 75 | – | 5 | 35 | 2 | 5 | 56 | 38 | – | 57 | 16 | 1 |

## DRY MEASURE.

| *qr.* | *bu.* | *p.* | *qu.* | *bu.* | *p.* | *ch.* | *bu.* | *p.* | *ch.* | *bu.* | *p.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 7 | 2 | 36 | 2 | 1 | 75 | 27 | 2 | 73 | 2 | 1 |
| 37 | 2 | 3 | 71 | – | 3 | 57 | 3 | 1 | 41 | 24 | – |
| 51 | 2 | – | 57 | 6 | – | 95 | 25 | 3 | 92 | 16 | 1 |
| 76 | 7 | 1 | 82 | 4 | 1 | 76 | 35 | 2 | 79 | 13 | 2 |
| 57 | – | 3 | 95 | 3 | 3 | 97 | 25 | 1 | 54 | 17 | 3 |
| 96 | 2 | 1 | 78 | 2 | 1 | 75 | 16 | 3 | 79 | 25 | 1 |

## TIME.

| *h.* | *m.* | " | *d.* | *h.* | *m.* | *w.* | *d.* | *h.* | *w.* | *d.* | *h.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 | 57 | 35 | 72 | 23 | 27 | 71 | 3 | 11 | 57 | 2 | 15 |
| 97 | 16 | 27 | 54 | 14 | 35 | 51 | 2 | 9 | 95 | 3 | 21 |
| 16 | 53 | 45 | 97 | 13 | 28 | 76 | – | 21 | 70 | – | 18 |
| 96 | 18 | 31 | 58 | 21 | 45 | 95 | 3 | 21 | 53 | 2 | 21 |
| 75 | 35 | 21 | 96 | 20 | 48 | 76 | 1 | 15 | 98 | – | 18 |

*The*

## The APPLICATION.

1. A Man born in the Year 1750, when will he be 47 Years of Age? *Anſwer* 1797.

2. *A, B, C, D,* went Partners in the Purchaſe of a Quantity of Goods; *A* laid out £7. half a Guinea and a Crown, *B* 49 *s.* *C* 54 *s.* 6 *d.* and *D* 87 *d.* What was laid out in all? *Anſwer* £13..6..3.

3. A Man lent his Friend at different Times theſe ſeveral Sums, *viz.* £63. £25..15. £32..7. £15..14..10 and fourſcore and nineteen Pounds, half a Guinea and a Shilling. How much did he lend in all? *Anſwer* £236..8..4.

4. What's the Eſtate worth *per Ann.* when the Taxes are 21 Guineas, the neat Income 8 Score £19. 14? *Anſwer* £201..15.

5. There are three Numbers the firſt 215 the ſecond 519, and the third is as much as the other two. What is the Sum of them all? *Anſwer* 1468.

6. Bought a Parcel of Goods, for which I paid £54..17. for Packing 13 *s.* 8 *d.* Carriage £1..5..4. and ſpent about the Bargain 14 *s.* 3 *d.* What do theſe Goods ſtand me in? *Anſwer* £57..10..3.

7. There are two Numbers, the leaſt whereof is 40, their Difference 14, I deſire to know what is the greateſt Number, and the Sum of both? *Anſwer* 54 *greateſt Number*, 94 *Sum.*

8. A Gentleman left his eldeſt Daughter £1500 more than the youngeſt, and her Fortune was 11 Thouſand 11 Hundred, and £11. What was the eldeſt Siſter's Fortune, and what did the Father leave them? *Anſ. Eldeſt Siſter's Fortune* £13611. *Father left them* £25722.

## SUBTRACTION *of* MONEY, WEIGHTS, *and* MEASURES.

RULE. Subtract as in Integers; only when any of the lower Denominations are greater than the upper, borrow as many of that as make one of the next Superior, adding it to the upper, from which take the leſſer; ſet down the Difference, and carry 1 to the next lower Denomination, for what you borrowed.

PROOF. As Integers.

## MONEY.

| | £. | s. | d. | | £. | s. | d. |
|---|---|---|---|---|---|---|---|
| Borrowed | 715 | 2 | $7\frac{1}{4}$ | Lent | 316 | 3 | $5\frac{1}{2}$ |
| Paid | 476 | 3 | $8\frac{1}{2}$ | Received | 218 | 2 | $1\frac{3}{4}$ |
| Remain to pay | 238 | 18 | $0\frac{3}{4}$ | | | | |
| Proof | 715 | 2 | $7\frac{1}{4}$ | | | | |

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 | 2 | 10 | 3 | 15 | $1\frac{1}{2}$ | 25 | 2 | $5\frac{1}{4}$ | 37 | 3 | $4\frac{1}{4}$ |
| 79 | 3 | $7\frac{1}{2}$ | 1 | 14 | 7 | 17 | 9 | $8\frac{1}{2}$ | 17 | 5 | $2\frac{1}{2}$ |

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 329 | 17 | $1\frac{1}{2}$ | 59 | 15 | $3\frac{1}{4}$ | 71 | 2 | 4 | 527 | 3 | $5\frac{1}{2}$ |
| 257 | 14 | 7 | 36 | 17 | $9\frac{1}{2}$ | 19 | 13 | $7\frac{3}{4}$ | 139 | 5 | $7\frac{1}{2}$ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Borrowed | 25107 | 15 | 7 | Lent | 25106 | 1 | 6 |
| | 375 | 5 | $5\frac{1}{4}$ | | 271 | 13 | $7\frac{1}{4}$ |
| Paid | 259 | 5 | $7\frac{1}{2}$ | Received | 359 | 15 | 3 |
| at | 395 | 13 | $4\frac{3}{4}$ | at | 475 | 13 | $9\frac{3}{4}$ |
| different | 523 | 17 | 3 | ſeveral | 527 | 15 | $3\frac{1}{4}$ |
| Times | 274 | 15 | $7\frac{1}{4}$ | Payments. | 279 | 16 | 5 |
| | 325 | 13 | 5 | | 150 | — | — |
| Paid in all | | | | | | | |
| Remains to pay | | | | | | | |

## TROY WEIGHT.

| | *oz.* | *dt.* | *gr.* | *oz.* | *dt.* | *gr.* | *lb.* | *oz.* | *dt.* | *gr.* | *lb.* | *oz.* | *dt.* | *gr.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bought | 27 | 15 | 2 | 7 | 5 | 15 | 52 | 1 | 7 | 2 | 7 | 2 | 5 | 5 |
| Sold | 21 | 14 | 7 | 6 | 7 | 14 | 39 | – | 15 | 7 | 5 | 7 | 1 | 7 |
| Unſold | | | | | | | | | | | | | | |

## AVOIRDUPOISE WEIGHT.

| *lb.* | *oz.* | *dr.* | *lb.* | *oz.* | *dr.* | *cwt.* | *qrs.* | *lb.* | *T.* | *ct.* | *qrs.* | *lb.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 11 | 15 | 35 | 10 | 5 | 35 | 1 | 21 | 21 | 1 | 2 | 7 |
| 17 | 9 | 15 | 29 | 12 | 7 | 25 | 1 | 20 | 9 | 1 | 3 | 5 |

## APOTHECARIES WEIGHT.

| ℥. ʒ. ℈. gr. | ℥. ʒ. ℈. gr. | lb. ℥. ʒ. ℈. | lb ℥. ʒ. ℈. |
|---|---|---|---|
| 27 .. 1 .. — .. 1 | 3 .. 1 .. 2 .. 4 | 5 .. 2 .. 1 .. — | 9 .. 7 .. 2 .. 1 |
| 15 .. 2 .. — .. 7 | 1 .. — .. — .. 7 | 2 .. 5 .. 2 .. 1 | 5 .. 7 .. 3 .. 1 |

## CLOTH MEASURE.

| E.F qrs. n. | yds. qrs. n. | yds. qrs. n. | E.F. qrs. n. |
|---|---|---|---|
| 35 .. 2 .. 2 | 47 .. 1 .. — | 71 .. 1 .. 2 | 35 .. 2 .. 1 |
| 17 .. 2 .. 1 | 35 .. 2 .. 2 | 3 .. 2 .. 1 | 17 .. 3 .. 2 |

## LONG MEASURE.

| f. in. bar. | yds. f. in. | m. fur. p. | lea. m. f. p. |
|---|---|---|---|
| 25 .. 1 .. — | 37 .. 2 .. 1 | 52 .. 1 .. 27 | 71 .. 1 .. 7 .. — |
| 17 .. 2 .. 2 | 15 .. 2 .. 7 | 25 .. 7 .. 35 | 50 .. — .. 3 .. 27 |

## LAND MEASURE.

| a. r. p. | a. r. p. | a. r. p. | a. r. p. |
|---|---|---|---|
| 75 .. 1 .. 7 | 37 .. 1 .. 27 | 25 .. — .. 1 | 325 .. 2 .. 1 |
| 39 .. — .. 27 | 35 .. 2 .. 15 | 17 .. 1 .. — | 279 .. 3 .. 5 |

## WINE MEASURE.

| run. gal. qts. | tier. gal. qts. | hhd. gal. qts. | tun. hhd. gal. |
|---|---|---|---|
| 72 .. 1 .. 1 | 25 .. 27 .. 1 | 75 .. 57 .. 1 | 79 .. 2 .. 14 |
| 35 .. 1 .. 2 | 19 .. 35 .. 2 | 57 .. 59 .. 1 | 35 .. 3 .. 27 |

## ALE *and* BEER MEASURE.

| A.B. fir. gal. | B.B. fir. gal. | hhd. gal. qts. | hhd. gal. qts. |
|---|---|---|---|
| 25 .. 1 .. 2 | 37 .. 2 .. 1 | 27 .. 27 .. 1 | 709 .. 2 .. 1 |
| 21 .. 1 .. 5 | 25 .. 1 .. 7 | 19 .. 50 .. 2 | 157 .. 3 .. 2 |

## DRY MEASURE.

| qu. bu. p. | qu. bu. p. | ch. bu. p. | ch. bu. p. |
|---|---|---|---|
| 72 .. 1 .. 2 | 65 .. 2 .. 1 | 79 .. 3 .. — | 35 .. 3 .. 3 |
| 35 .. 2 .. 3 | 57 .. 2 .. 3 | 54 .. 7 .. 1 | 23 .. 5 .. 1 |

## TIME.

| h. ′ ″ | d. h. ′ | m. w. d. | m. w. d. |
|---|---|---|---|
| 75 .. 1 .. 27 | 72 .. 1 .. 51 | 35 .. 2 .. 1 | 65 .. 2 .. 1 |
| 52 .. 7 .. 31 | 36 .. 3 .. 27 | 17 .. 3 .. 5 | 14 .. 1 .. 5 |

### *The* APPLICATION.

1. A Man born in the Year 1723, what was his Age in the Year 1766? *Anſwer* 43.

2. What is the Difference between the Age of a Man born in 1710, and another born in 1766? *Anſ.* 56.

3. A Merchant had 5 Debtors, *A*, *B*, *C*, *D*, and *E*; which, together owed him £1156, *B*, *C*, *D*, and *E*, owed him £737, what was *A*'s Debt; *Anſ.* £419.

4. When an Eſtate of £300 *per Annum* is reduced, on paying of Taxes, to 12 Score, and £14 - 6 *s.* what is the Tax? *Anſwer* £45..14..–.

5. What is the Difference between 9154, and the Amount of 754 added to 305; *Anſwer* £8095.

6. A Horſe in his Furniture is worth £37 . 5 *s.* out of it 14 Guineas: How much does the Price of the Furniture exceed that of the Horſe? *Anſwer* £7..17..–.

7. A Merchant at his Out-ſetting in Trade, owed £750. He had in Caſh, Commodities, the Stocks, and good Debts, £12510..7..–. He cleared the firſt Year by Commerce £452 .3..5. what was the neat Balance at the 12 Months End? *Anſwer* £12212..10..5.

8. A Gentleman dying left £45247, between two Daughters; the Youngeſt was to have 15 Thouſand, 15 Hundred, and twice £15. What was the elder Siſter's Fortune? *Anſwer* £28717.

### MULTIPLICATION *of ſeveral* DENOMINATIONS.

RULE. Multiply the firſt Denomination by the Quantity given, dividing the Product by as many of that as make one of the next, ſetting down the Remainder, and add the Quotient to the next Superior, after it is multiplied.

If the given Quantity is above 12, multiply by any two Numbers, which multiplied together, will make the ſame Number; but if no two Numbers multiplied together will make the exact Number, then multiply the top Line by as many as is wanting, adding it to the laſt Product.

PROOF. By Diviſion.

| £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 12 | 7¾ | 75 | 13 | 1½ | 62 | 5 | 4¼ | 57 | 2 | 4¾ |
| | | 2 | | | 5 | | | 4 | | | 5 |
| 71 | 5 | 2½ | | | | | | | | | |

Ib.

| *lb.* | *oz.* | *dwt.* | *gr.* | *ton.* | *cwt.* | *qrs.* | *lb.* | *yds.* | *n* | *qrs.* | *m.* | *fur.* | *p.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 5 | 17 | 4 | 25 | 7 | 2 | 1 | 76 | 1 | 2 | 36 | 7 | 5 |
| | | | 7 | | | | 8 | | | 2 | | | 5 |

| *a.* | *r.* | *p.* | *A.B.* | *fir.* | *gal.* | *B.B.* | *fir.* | *gal.* | *m.* | *fur.* | *p.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 2 | 1 | 32 | 1 | 7 | 26 | 2 | 7 | 54 | 2 | 1 |
| | | 9 | | | 7 | | | 3 | | | 5 |

1. 18 Yds of Cloth, at 9*s.* 6*d.* *per* yd.
9×2=18
9
4..5..6
2
8..11..–

2. 26 lb. of Tea, at £1..2..6 *per* lb.
8×3+2=26
8
9..–..–
3
27..–..–
Top Line × 2 2..5..–
29..5..–

3. 17 Ells of Holland, at 7*s.* 8*d.* ½ *per* Ell.
*Facit* £6..11..–½

4. 35 Firkins of Butter, at 15*s.* 3*d.* ½ *per* Firkin.
*Facit* £26..15..2½

5. 75 lb. of Nutmegs, at 7*s.* 2*d.* ¾ *per* lb.
*Facit* £27..2..2¼

6. 37 yds of Tabby, at 9*s.* 7*d.* *per* yd.
*Facit* £17..14..7

7. 97 cwt. of Cheeſe, at £1..5..3 *per* cwt.
*Facit* £122..9..3

8. 43 Doz. of Candles, at 6*s.* 4*d.* *per* doz.
*Facit* £13..12..4

9. 127 lb. of Bohea Tea, at 12*s.* 3*d* *per* lb.
*Facit* £77..15..9

10. 135 Gallons of Rum, at 7*s.* 5*d.* *per* Gall.
*Facit* £50..1..3

11. 74 Ells of Diaper, at 1*s.* 4*d.* ½ *per* Ell.
*Facit* £5..1..9

12. 6 doz. Pair of Gloves, at 1*s.* 10*d.* *per* Pair.
*Facit* £6..12..–

When the given Quantity conſiſts of ½, ¼, &*c.* divide the Price by ½, ¼, &*c.* and add it to the Product.

13. 25 ½ *Ells* of Holland, at 3*s.* 4*d.* ½ *per Ell.*

5    5×5=25

16 . . 10 ½

5

4 . . 4 . . 4 ½ =25

– . . 1 . . 8 ¼ = ½

4 . . 6 . . – ¾ =25 ½

14. 75 ½ *Ells* of Diaper, at 1*s.* 3*d. per Ell.*
*Facit* £4..14..4 ½.

15. 19 ½ *Ells* of Damaſk, at 4*s.* 3*d. per Ell.*
*Facit* £4..2..10 ½.

16. 35 ½ *Ells* of Dowlas, at 1*s.* 4*d. per Ell.*
*Facit* £2..7..4.

17. 7 ¼ *cwt.* of Malaga Raiſins, at £1..1..6. *per cwt.*
*Facit* £7..15..10 ½.

18. 6 ½ *Barrels* of Herrings, at £3..15..7.
*Facit* £24..11..3 ½.

19. 35 ½ *cwt.* Double refined Sugar, at £4..15..6 *per.*
*Facit* £169..10. 3.

20. 154 ½ *cwt.* of Tobacco, at £4..17..10. *per cwt.*
*Facit* £755..15..3.

21. 117 ¼ *Gallons* of Arrack, at 12*s.* 6*d. per Gall.*
*Facit* £73..5..7 ½.

22. 85 ¾ *cwt.* Cheeſe, at £1..7..8. *per cwt.*
*Facit* £118..12..5.

23. 29 ¼ *lb.* of fine Hyſon Tea, at £1..3..6. *per lb.*
*Facit* £34..7..4 ½.

24. 17 ¾ *Yds.* of ſuperfine *Scarlet* Drab, at £1..3..6 *per.*
*Facit* £20..17..1 ½.

25. 37 ½ *Yds.* of rich Brocaded Silk, at 12*s.* 4*d. per.*
*Facit* £23..2..6.

26. 56 ¾ *cwt.* of Sugar, at £2..18..7. *per cwt.*
*Facit* £166..4..7 ¼.

27. 96 ½ *cwt.* of Currants, at £2..15..6. *per cwt.*
*Facit* £267..15..9.

28. 45 ¾ *lb.* of Belladine Silk, at 18*s.* 6*d. per lb.*
*Facit* £42..6..4 ½.

29. 87 *Buſhels* ¾ of Wheat, at 4*s.* 3*d. per Buſhel.*
*Facit* £18..12..11 ¼

30. 120 ¾ *cwt.* of Hops, at £4..7..6. *per cwt.*
*Facit* £528..5..7 ½.

### *The* APPLICATION.

1. What Sum of Money muſt be divided amongſt 18 Men, ſo that each may receive £14..6..8 ½ ?

*Anſ.* £258..–..9.

2. A Privateer of 250 Men took a Prize which amounted to £125..15..6 to each Man, what was the Value of the Prize ? *Anſ.* £31443..15..–.

3. What is the Difference between 6 Dozen Dozen, and half a Dozen Dozen ; and what is their Sum and Product ?

*Anſ.* 792. *Diff. Sum* 936. *Product* 62208.

4. What Difference is there between twice eight and Fifty, and twice Fifty-eight and what's their Product ?

*Anſ.* 50 *Diff.* 7656 *Prod.*

5. There are 2 Numbers, the greater of them is 37 Times 45, and their Difference 19 Times 4 ; their Sum and Product are required ? *Anſ.* 3254 *Sum* 2645685 *Pro.*

6. The Sum of 2 Numbers is 360, the leſs of them 144, what is their Product, and the Square of their Difference ?

*Anſ.* 31104. *Product*, 5184. *Square of their Difference.*

7. If an Army, conſiſting of 187 Squadrons of Horſe, each 157 Men, and 207 Battalions, each 560 Men, how many effective Soldiers, ſuppoſing that in 7 Hoſpitals there are 473 Sick ? *Anſ.* 144806.

8. What Sum did that Gentleman receive in Dowry with his Wife, whoſe Fortune was her Wedding Suit ; her Petty-coat, having two rows of Furbelows, each Furbelow 87 Quils, and each Quil 21 Guineas ? *Anſ.* £3836..14..–.

9. A Merchant had £19118. to begin Trade with. For 5 Years together he cleared £1086. a Year ; the next 4 Years he made good £2715..10..6. a Year : but the laſt 3 Years he was in Trade, had the Misfortune to looſe, one Year with another £475..4..6. a Year : What was his real Fortune at 12 Years End ? *Anſ.* £33984..8. 6.

## DIVISION *of ſeveral* DENOMINATIONS.

RULE. Divide the firſt Denomination on the Left Hand, and, if any remains, multiply them by as many of the next leſs as make one of that, which add to the next, and divide as before.

PROOF. By Multiplication.

| £. s. d. | £. s. d. | £. s. d. | £. s. d. |
|---|---|---|---|
| 2)25..2..4( | 3)37..3..7( | 4)57..3..6( | 5)52..7..3( |
| 12..11..2 | | | |

th

| | | |
|---|---|---|
| *lb. oz. dwt. gr.* | *lb. oz. dr* | *T. cwt. qrs. lb.* |
| 7)75 .. 3 .. 7 .. 5( | 8)35 .. 14 .. 13( | 6)5 .. 10 .. 1 .. 13) |
| *C. qrs. n.* | *m. f. p* | *yds. f. in.* |
| 11)35 .. 1 .. 3( | 9)76 .. 3 .. 27( | 1275 .. 2 .. 9( |
| *A. H. fir. gal.* | *B.B. fir. gal.* | *ch. n. pk.* |
| 12)35 [illegible] 4 .. 5) | 955 .. 3 .. 7) | 11)357 .. 2 .. 1( |

### *The* APPLICATION.

1. If a Man ſpends £257..2..5 in 12 Months Time, what is that *per* Month? *Anſ.* £21..8..6 ¼.

2. The Cloathing of 35 Charity Boys came to £57..3..7. what is the Expence of each? *Anſ.* £1..12..8.

3. If I gave £37..6..4 ¾ for 9 Pieces of Cloth, what did I give *per* Piece? *Anſ.* £4..2..11.

4. If 20 Cwt. of Tobacco came to £27..5..4 ½ at what Rate is that *per* Cwt.? *Anſ.* £1..7..3.

5. What is the Value of 1 Hogſhead of Beer, when 120 are ſold for £154..17..10.? *Anſ.* £1..5..9 ¾.

6. Bought 72 Yards of Cloth for £83..6..– I deſire to know at what Rate *per* Yard? *Anſ.* £1..3..8 ¼.

7. Gave £275..3..4. for 36 Bales of Cloth, what is that for 2 Bales? *Anſ.* £15..5..8 ¼.

8. A Prize of £7257..3..6, is to be equally divided amongſt 500 Sailors, what is each Man's Share? *Anſ.* 14..10..3 ¼

9. There are 2545 Bullocks to be divided among 509 Men, I deſire to know how many each Man had, and the Value of each Man's Share, ſuppoſing every Bullock worth £9..14..6? *Anſ. 5 Bullocks each Man, £48..12..6, each Share.*

10. A Gentleman has a Garden walled in, containing 9625 Yards, the Breadth was 35 Yards, what was the Length? *Anſ.* 275.

11. A Club in *London*, conſiſting of 25 Gentleman, joined for a Lottery Ticket of £10. Value, which came up a Prize of £4000. I deſire to know what each man contributed, and what each Man's Share came to? *Anſ. each contributed 8s. each Share* £160.

12. A Trader cleared £1156. equally in 17 Years, how much did he lay by in a Year? *Anſ.* £68.

13. Another cleared £2805 in 7 ½ Years, what was his yearly Increaſe of Fortune? *Anſ.* £374.

14. What Number to the 43d Part of 4429 will raiſe it to 240? *Anſ.* 137.

15. Divide 20*s.* between *A*, *B*, and *C*, in ſuch Sort than *A*, may have 2*s*, leſs than *B*, and *C*, 2*s.* more than *B*? *Anſ.* *A*, £–..4..8.. *B*, £–..6..8. *C*, £–..8..8.

16. If there are 1000 Men to a Regiment, and but 50 Officers, how many private Men are there to one Officer? *Anſ.* 19.

17. What Number is that which multiplied by 7847. will make the Product 3013248? *Anſ.* 384.

18. The Quotient is 1083, the Diviſor, 28604. what was the Dividend, if the Remainder came out 1788? *Anſ.* 30979920.

## BILLS *of* PARCELS.

### HOSIER's.

*Mr.* John Thomas

*Bought of* Samuel Green, *March* 7, 1768.

| | | S. | D. | |
|---|---|---|---|---|
| 8 | Pair of Worſted Stockings at | 4 | 6 | *per* Pair £ |
| 5 | Pair of Thread ditto - - - - at | 3 | 2 | - - - - - - |
| 3 | Pair of Black Silk Ditto - at | 14 | 0 | - - - - - - |
| 6 | Pair of milled Hoſe - - - - at | 4 | 2 | - - - - - - |
| 4 | Pair of Cotton Ditto - - - - at | 7 | 6 | - - - - - - |
| 2 | Yards of fine Flannel - - - at | 1 | 8 | *per* Yard. |

£7..12..2

### MERCER's.

***Mr.* Iſaac Grant**

*Bought of* John Sims, *March* 12, 1768.

| | | S. | D. | |
|---|---|---|---|---|
| 15 | Yards of Sattin - - - - - - at | 9 | 6 | *per* Yard £ |
| 18 | Yards of flowered Silk at | 17 | 4 | - - - - - - - - |
| 12 | Yards of rich Brocade - at | 19 | 8 | - - - - - - - - |
| 16 | Yards of Sarſanet - - - at | 3 | 2 | - - - - - - - - |
| 13 | Yards of Genoa Velvet at | 27 | 6 | - - - - - - - - |
| 23 | Yards of Luſtring - - - - at | 6 | 3 | - - - - - - - - |

£62..2..5

LINE

### LINEN-DRAPER's.

*Mr*, Simon Surety

*Bought of* Joſiah Short, 27 *March*, 1768.

| | | | S. | D. | |
|---|---|---|---|---|---|
| 4 | Yards of Cambric - - - | at | 12 | 6 | *per* Yard £ |
| 12 | Yards of Muſlin - - - - | at | 8 | 3 | - - - - - - - |
| 15 | Yards of printed Linen | at | 5 | 4 | - - - - - - - |
| 2 | Dozen of Napkins - - | at | 2 | 3 | each - - - |
| 14 | Ells of Diaper - - - - - | at | 1 | 7 | *per* Ell - - |
| 35 | Ells of Dowlas - - - - - | at | 1 | 1½ | - - - - - - - |

£17..4..6½

### MILLENER's.

*Mrs.* Bright

*Bought of* Lucy Brown, 5 *April*, 1768.

| | | | L. | S. | D. | |
|---|---|---|---|---|---|---|
| 18 | Yards of fine Lace - - | at | – | 12 | 3 | *per* Yard £ |
| 5 | Pair of fine Kid Gloves | at | – | 2 | 2 | *per* Pair - - |
| 12 | Fans of *French* Mounts | at | – | 3 | 6 | each - - - - |
| 2 | Fine lac'd Tippets - - - | at | 3 | 3 | | - - - - - - - |
| 4 | Dozen of *Iriſh* Lamb - | at | – | 1 | 3 | *per* Pair - - |
| 6 | Sets of Knots - - - - - | at | – | 2 | 6 | *per* Set - - |

£23..14..4

### WOOLLEN-DRAPER's,

*Mr* Thomas Sage

*Bought of* Ellis Smith, 7 *April*, 1768.

| | | | L. | S. | D. | |
|---|---|---|---|---|---|---|
| 17 | Yards of fine Serge - - - - | at | – | 3 | 9 | *per* Yard £ |
| 18 | Yards of Drugget - - - - - | at | – | 9 | | - - - |
| 15 | Yards of ſuperfine ſcarlet | at | 1 | 2 | | - - - |
| 16 | Yards of black ditto - - - | at | – | 18 | | - - - |
| 25 | Yards of Shalloon - - - - | at | – | 1 | 9 | - - |
| 17 | Yards of Drab - - - - - - - | at | – | 17 | 6 | - - |

£59 .. 5 .. –

## LEATHER-SELLER's.

*Mr.* Giles Harris

*Bought of* Abel Smith. 15 *April*, 1768.

|  |  |  | S. D. |  |
|---|---|---|---|---|
| 27 | Calf Skins - - - - - - - - | at | 3..9 | *per* Skin £ |
| 75 | Sheep Skins - - - - - - - | at | 1..7 | - - - - - |
| 36 | Coloured ditto - - - - - | at | 1..8 | - - - - - |
| 15 | Buck Skins - - - - - - - - | at | 11..6 | - - - - - |
| 17 | Ruſſia Hides - - - - - - - | at | 10..7 | each - |
| 120 | Lamb Skins - - - - - - - | at | 1..2 ½ | - - - |

£38..17..5

## GROCER's.

*Mr.* Richard Groves

*Bought of* Francis Elliot, 21 *April*, 1768.

|  |  |  |  |  |
|---|---|---|---|---|
| 25 | *lb.* of Lump Sugar - - - | at | –.. 6 ½ | *per* lb. £ |
| 2 | Loaves of double refined,<br>Weight 15 lb. } | at | –..11 ½ | - - |
| 14 | lb, of Rice - - - - - - - - - - - - | at | –.. 3 | - - - |
| 28 | lb, of *Malaga* Raiſins - - - | at | –.. 5 | - - - |
| 15 | lb, of Currants - - - - - - - - | at | –.. 5½ | - - |
| 7 | lb, of black Pepper - - - - | at | 1..10 | - - - |

£3..2..9 ½

## CHEESE-MONGER's

*Mr.* Charles Croſs

*Bought of* Samuel Grant, 23 *April*, 1768.

|  |  |  | S. D. |  |
|---|---|---|---|---|
| 8 | lb. of *Cambridge* Butter - - | at | –..6 | *per* lb. £ |
| 17 | lb. of new Cheeſe - - - | at | –..4 | - - - |
| ½ | Firkin of Butter, Wt. 28 lb. | at | –..5 ½ | - - |
| 5 | *Cheſhire* Cheeſes Wt. 127 lb. | at | –..4 | - - - |
| 2 | *Warwickſhire* do. Wt. 15 lb. | at | –..3 | - - - |
| 12 | lb. of Cream Cheeſe - - - - | at | –..6 | - - - |

£3..14..7

### CORN-CHANDLER's:

*Mr.* Abrabam Doyley

*Bonght of* Iſaac Jones, 25 *April*, 1768.

| | | S. | D. | |
|---|---|---|---|---|
| Tares 19 Buſhels - - - | at | 1.. | 10 | *per* Buſhel £ |
| Peas 18 Buſhels - - - | at | 3.. | 9 ½ | - - - - - - |
| Malt 7 Quarters - - - | at | 25.. | – | *per* Quarter |
| Hops 15 lb. - - - - - | at | 1.. | 5 | *per* lb. |
| Oates 6 Quarters - - - | at | 2.. | 4 | *per* Buſhel |
| Beans 12 Buſhels - - - | at | 4.. | 8 | - - - - - - |
| | | | | £23..7..4 |

## REDUCTION.

IS the bringing or reducing Numbers of one Denomination into other Numbers of another Denomination, retaining the ſame Value, and is performed by Multiplication and Diviſion.

*Firſt*, All great Names are brought into ſmall, by multiplying with ſo many of the leſs as make one of the greater.

*Secondly*, All ſmall Names are brought into great, by dividing with ſo many of the leſs as make one of the greater.

TABLE *of* COIN's *as are current in* England.

| | L. S. D. | | |
|---|---|---|---|
| Portngal Pieces | 3..12..– | Guinea - - | 1.. 1.– |
| Ditto - - - - - - | 1 .16..– | Half ditto - - | –..10. 6 |
| Half ditto - - - | –..18..– | ¼ ditto - - - | –.. 5..3 |
| ¼ ditto - - - - - | –.. 9..– | Crown - - - | –.. 5..– |
| ⅛ ditto - - - - - | –.. 4..6 | Half ditto - | –.. 2..6 |
| Moidore - - - - | 1.. 7..– | | |
| Half ditto - - - | –. 13..6 | | |
| Quarter ditto - | –.. 6. 9 | | |

Note, *There are ſeveral Pieces that ſpeak their own Value, ſuch as a Six-pence, Three-pence, Two-pence, Penny, Half-penny, Farthing.*

RE-

# REDUCTION *Deſcending.*

1. In £8. how many Shillings and Pence?

20

160 Shillings.

12

1920 Pence.

2. In £12. How many Shillings, Pence and Farthings?
*Anſ.* 240s. 2880*d.* 11520 *far.*

3. How many Shillings, Pence and Farthings, are there in £18? *Anſ.* 360s. 4320*d.* 17280 *far.*

4. Reduce £7. and a Crown into Shillings and Pence.
*Facit* 145*s.* 1740*d.*

5. How many Farthings are there in 21 Guineas?
*Anſ.* 21168.

6. In £17..5..3½, how many Farthings? *Anſ.* 16573.

7. In £25..14..1, how many Shillings and Pence?
*Anſ.* 514*s.* 6169*d.*

8. In 15 Crowns, how many Shillings and Six-pences?
*Anſ.* 75*s.* 150 *Sixpences.*

9. How many Crowns and Shillings in £25.
*Anſ.* 100 *Crowns* 500*s.*

10. In 57 Half-Crowns, how many Pence and Farthings?
*Anſ* 1710*d.* 6840 *far.*

11. In 52 Crowns, as many Half-Crowns, Shillings, and Pence, how many Farthings? *Anſ.* 21424.

12. How many Half Crowns, Six-pences and Three-pences, are there in £75?
*Anſ.* 600 *Half Cr*, 3000 *Six-pences,* 6000 *Three-pences.*

# REDUCTION *Aſcending.*

13. In 1920 Pence, how many Shillings and Pounds?
*Anſ.* 160*s.* £8.

12) 1920

2|0)16|0( Shillings.

8 Pounds.

14. In 11520 Farthings, how many Pence, Shillings and Pounds? *Anſ.* 2880*d.* 240*s.* £12.

15. How many Pence, Shillings, and Pounds, are there in 17280 Farthings? *Anſ.* 4320*d*, 360*s.* £18.

16. Reduce 1740 Pence into Shillings and Pounds.
*Facit* 145*s.* £7..5.

17. How many Guineas in 21168 Farthings?
*Anſ.* 21 *Guineas.*

18. In 16573 Farthings how many Pounds?
*Anſ.* £17..5..3 ¼

19. In 6169 Pence how many Shillings and Pounds?
*Anſ.* 514*s.* £25..14..1.

20. In 900 Pence, how many Shillings and Crowns?
*Anſ.* £75*s.* 15 *Crowns.*

21. How many Crowns and Pounds in 500 Shillings?
*Anſ.* £100 *Crowns* £25.

22. In 6840 Farthings, how many Pence, and Half-Crowns; *Anſ* 1710*d.* 57 *Half-Crowns.*

22. In 21424 Farthings, how many Crowns, Half-Crowns, Shillings and Pence, and of each an equal Number? *Anſ.* 52.

24. How many Sixpences, Half-Crown and Pounds in 6000 Three-pences?
*Anſ.* 3000 *Six-pences*, 600 *Half-Crowns*, £75.

*Aſcending* and *Deſcending.*

25. 1560 Pence how many Crowns and Shillings?
*Anſ.* 26 *Crowns* 130*s.*

6|0)156|0

---

26 Crowns
5

---

130 Shillings.

26. Reduce 130 Shillings into Crowns and Pence.
*Facit* 26 *Crowns* 1560*d.*

27. How many Shillings, Crowns and Pounds in 60 Guineas? *Anſ.* 1260*s.* 252 *Crowns*, £63.

28. In £63. how many Crowns, Shillings and Guineas?
*Anſ.* 252 *Crowns*, 1260*s.* 60 *Gui.*

29. Reduce 76 Moidores into Shillings and Pounds.
*Facit* 2052*s.* £102..12..–

30. Reduce £102..12..– into Shillings and Moidores.
*Facit* 2052*s.* 76 *Moidores.*

31. How many Shillings, Half-Crowns and Crowns are there in £556 and of each an equal Number?

*Anſ.* 1308. *each, and 2s. over.*

32. In 1308 Half Crowns, as many Crowns and Shillings, how many Pounds? *Anſ.* £555..18..–.

33. Seven Men brought £15..10.–. each into the Mint to be changed for Guineas, how many muſt they have in all? *Anſ.* 103 *Guineas 7s. over.*

34. If 103 Guineas and 7 Shillings is to be divided amongſt 7 Men, how many Pounds Sterling is that to each?

*Anſ.* £15. 10. –.

35. A certain Perſon had 25 Purſes, and in each Purſe 12 Guineas, a Crown and a Moidore, how many Pounds Sterling had he in all? *Anſ.* £355.

36. A Gentleman in his Will leaves £50 to the Poor, and ordered that $\frac{1}{3}$ ſhould be given to antient Men, each to have 5*s.*—$\frac{1}{4}$ to poor Women, each to have 2*s.* 6*d.*—$\frac{1}{5}$ to poor Boys, each to have 1*s.*—$\frac{1}{6}$ to poor Girls, each to have 9*d.* and the Remainder to the Perſon that diſtributed it. I demand how many of each Sort there were, and what the Perſon that diſtributed the Money had for his Pains?

*Anſ.* 66 *Men,* 100 *Women,* 200 *Boys,* 222 *Girls,* £2..13..6. *to the Perſon.*

## TROY WEIGHT.

37. In 27 Ounces of Gold, how many Grains?

*Anſ.* 12960.

38. In 12960 Grains of Gold, how many Ounces?

*Anſ* 27.

39. In 3 *lb.* 10 *oz.* 7 *dwt.* 5 *gr.* how many Grains?

*Anſ.* 22253.

40. In 8 Ingots of Silver, each weighing 7 *lb.* 4 *oz.* 17 *dwt.* 15 *gr.* how many Ounces, Penny weights and Grains?

*Anſ* 711 *oz.* 14221 *dwt.* 341304 *gr.*

41. How many Ingots of 7 *lb.* 4 *oz.* 17 *dwt.* 15 *gr.* each, are there in 341304 Grains? *Anſ.* 8 *Ingots.*

42. Bought 7 Ingots of Silver, each containing 23 *lb.* 5 *oz.* 7 *dwt.* how many Grains? *Anſ.* 945336.

43. A Gentleman ſent a Tankard to his Goldſmith, that weighed 50 *oz.* 8 *dwt.* and ordered him to make it into Spoons, each to weigh 2 *oz.* 16 *dwt.* how many had he?

*Anſ.* 18.

44. A Gentleman delivered to a Goldſmith 137 *oz.* 6 *dwt.* 9 *gr.* of Silver, and ordered him to make it into Tankards of 17 *oz.* 15 *dwt.* 10 *gr.* each. Spoons of 21 *oz.* 11 *dwt.* 13 *gr. per* Dozen, Salts of 3 *oz.* 10 *dwt.* each, and Forks of 21 *oz.* 11 *dwt.* 13 *gr. per* Dozen; and for every Tankard to have one Salt, a Dozen of Spoons, and a Dozen of Forks; what is the Number of each he muſt have?

*Anſ.* 2 *of each Sort,* 8 *oz.* 9 *dwt.* 9 *gr. over.*

## AVOIRDUPOISE WEIGHT.

Note, *There are ſeveral Sorts of Silk which are weighed by a great Pound of* 24 oz. *others by the common Pound of* 16 oz. *therefore.*

To bring great Pounds into common, multiply by 3, and divide by 2, or add one half.

To bring ſmall Pounds into great, multiply by 2, and divide by 3, or ſubtract one Third.

### *Things bought and ſold by the Tale,*

| *Dozens.* | |
|---|---|
| 12 Pieces or Things make | 1 Doz. |
| 12 Dozen - - - - | 1 Groſs. |
| 12 Groſs or 144 Doz. | 1 Great Groſs |

| *Paper and Parchments.* | |
|---|---|
| 24 Sheets make | 1 Quire. |
| 20 Quire - - - | 1 Ream. |
| 2 Reams - - | 1 Bundle. |
| 1 Doz. of Par. | 12 Skins. |
| 12 Skins - - - - | 1 Roll. |

45. In 14769 Ounces, how many *cwt.*

*Anſ.* 8 *cwt.* 0 *qr.* 27 *lb.* 1 *oz.*

46. Reduce 8 *cwt.* 0 *qr.* 27 *lb.* 1 *oz.* into Quarters, Pounds and Ounces. *Facit* 32 *qrs.* 923 *lb.* 14769 *oz.*

47. Bought 32 Bags of Hops, each 2 *cwt* 1 *qr.* 14 *lb.* and another of 150 *lb.* how many *cwt.* in the Whole?

*Anſ.* 77 *cwt,* 1 *qr.* 10 *lb.*

48. In 34 *ton.* 17 *cwt.* 1 *qr.* 19 *lb.* how many Pounds?

*Anſ.* 78111 *lb.*

49. In 350 great Pounds how many common? *Anſ.* 525 *lb.*

50. In 27 *cwt.* of Raiſins, how many Parcels of 18 *lb.* each? *Anſ.* 168.

51. In 9 *cwt.* 2 *qrs.* 14 *lb.* of Indigo, how many Pounds?

*Anſ.* 1078 *lb.*

52. In 547 great Pounds how many common Pounds?
*Anſ.* 820 *com. lb.* 8 *oz.*

53. Bought 27 Bags of Hops, each 2 *cwt.* 1 *qr.* 15 *lb.* and 1 Bag of 137 *lb.* how many Hundreds in the Whole?
*Anſ.* 65 *cwt.* 2 *qrs* 10 *lb.*

54. How many Pounds in 27 Hogſheads of Tobacco, each weighing neat 8 *cwt.* ¾? *Anſ.* 26460.

55. In 552 common Pounds of Silk how many great Pounds? *Anſ.* 368.

56. How many Parcels of Sugar of 16 *lb.* 2 *oz.* are there in 16 *cwt.* 1 *qr.* 15 *lb.* *Anſ.* 113 *par.* 12 *lb.* 14. *oz.*

### *The Allowance uſually made in this Weight are,* TARE, TRETT *and* CLOFF.

TARE is an Allowance made to the Buyer for the Weight of the *Box, Barrel, Bag, &c.* which contains the Goods bought, and is either.

At ſo much *per Box, Bag, Barrel, &c.*
At ſo much *per Cent.* or.
At ſo much in the *Groſs Weight.*

TRET is an Allowance of 4 *lb.* in every 104 *lb.* for Waſte, Duſt, *&c.* made by the Merchant to the Buyer.

CLOFF is an Allowance of 2 *lb.* to the Citizens of *London* on every Draught above 3 *cwt.* on ſome Sort of Goods.

GROSS WEIGHT, is the whole Weight of any Sort of Goods and that which contains it.

SUTTLE is when part of the Allowance is deducted from the Groſs.

NEAT is the pure Weight when all Allowances are deducted.

RULE 1ſt. When the Tare is at ſo much *per* Bag, Barrel, *&c.* multiply the Number of Bags, Barrels, *&c.* by the Tare, and ſubtract the product from the Groſs, the Remainder is neat.

Note, *To reduce Pounds into Gallons, multiply by* 2, *divide by* 15.

57. In 7 Frails of Raiſins, each weighing 5 *cwt.* 2 *qr.* 5 *lb.* Groſs, Tare at 23 *lb. per* Frail, how much neat Weight?
*Anſ.* 37 *cwt.* 1 *qr.* 14 *lb.*

```
     23                  5..2.. 5
      7                        7
   ———4)              ————————
28)161(5              38..3.. 7 = Groſs Weight.
   140 1..1            1..1..21 = Tare.
   ———                ————————
    21                37..1..14 Neat.
```

58. In 241 Barrels of Figs, each 3 *qrs.* 19 *lb.* Groſs, Tare 10 *lb. per* Barrel, how many Pounds neat? *Anſ.* 22413.

59. What is the neat Weight of 25 Hogſheads of Tobacco, weighing Groſs 163 *cwt.* 2 *qrs.* 15 *lb.* Tare 100 *lb. per* Hogſhead? *Anſ.* 141 *cwt.* 1 *qr.* 7 *lb.*

60. In 16 Bags of Pepper, each 85 *lb.* 4 *oz.* Groſs, Tare *per* Bag 3 *lb.* 5 *oz.* how many Pounds neat? *Anſ.* 1311.

RULE 2. When the Tare is at ſo much in the whole Groſs Weight, ſubtract the given Tare from the Groſs, the Remainder is neat.

61. What is the neat Weight of 5 Hogſheads of Tobacco, weighing Groſs 75 *cwt.* 1 *qr*, 14 *lb.* Tare in the whole 752 *lb?* *Anſ.* 68 *cwt.* 2 *qrs.* 18 *lb.*

62. In 75 Barrels of Figs each 2 *qrs.* 27 *lb.* Groſs, Tare in the Whole 597 *lb.* how much neat Weight?

*Anſ.* 50 *cwt.* 1 *qr.*

RULE 3. When the Tare is ſo much *per Cent.* divide the Groſs Weight by the aliquot Parts of an *cwt.* which ſubtract from the Groſs, the Remainder is neat.

*Note*, 7 *lb.* is $\frac{1}{16}$. 8 *lb.* is $\frac{1}{14}$. 14 *lb.* is $\frac{1}{8}$. 16 *lb.* is $\frac{1}{7}$.

63. What is the neat Weight of 18 Butts of Currants, each 8 *cwt.* 2 *qrs.* 5 *lb.* Tare at 14 *lb. per Cent?*

```
               8..2.. 5
                    9×2=18.
              ————————
              76..3..17
                     2
             —————————
    14=⅛)153..3.. 6
              19..0..25 ¾
             —————————
             134..2.. 8 ¾
```

64. In 25 Barrels of Figs, each 2 *cwt*, 1 *qr.* Groſs, Tare *per Cent.* 16 *lb.* how much neat Weight?

*Anſ.* 48 *cwt.* 0 *qr.* 24 *lb.*

65. What is the neat Weight of 9 Hogſheads of Nutmegs, each weighing Groſs 8 *cwt.* 3 *qrs.* 14 *lb.* Tare 16 *lb. per Cent.* *Anſ.* 68 *cwt.* 1 *qr.* 24 *lb.*

66. What is the neat Weight of 12 Caſks of Argol, Groſs 84 *cwt.* 2 *qrs.* 14 *lb.* Tare *per Cent.* 14 *lb.*

*Anſ.* 74 *cwt.* 0 *qr.* 5 *lb.* $\frac{1}{4}$.

RULE 4. When Trett is allowed with Tare, divide the Pounds Suttle by 26, the Quotient is the Trett, which ſubtract from the Suttle, Remainder is neat.

67. In one Butt of Currants, weighing 12 *cwt.* 2 *qrs.* 24 *lb.* Groſs, Tare 14 *lb. per Cent.* Trett, 4 *lb. per* 104 *lb.* how many Pounds neat?

12..2..24
4

50
28

14 = $\frac{1}{8}$ 1424 *Groſs.*
178 *Tare.*

26)1246 *Suttle.*
47 *Trett.*

1199 *Neat.*

68. In 7 *cwt.* 3 *qrs.* 27 *lb.* Groſs, Tare 36 *lb.* Trett 4 *lb. per* 104 *lb.* how many *lb.* neat? *Anſ.* 826 *lb.*

69. In 152 *cwt.* 1 *qr.* 3 *lb.* Groſs, Tare 10 *lb. per Cent.* Trett 4 *lb. per* 104 *lb.* how much neat Weight?

*Anſ.* 133 *cwt.* 1 *qr.* 11 *lb* $\frac{1}{2}$.

70. In 15 Cheſts of Sugar, weighing 117 *cwt.* 0 *qr.* 21 *lb.* Groſs, Tare 173 *lb.* Trett 4 *lb. per* 104 *lb.* how many *cwt.* neat? *Anſ.* 111 *cwt.* 0 *qr.* 22 *lb.*

RULE 5. When Cloff is allowed, multiply the *cwt.* Suttle by 2, divide the Product by 3, the Quotient will be the Pounds Cloff, which ſubtract from the Suttle, the Remainder will be neat.

71. Wha

71. What is the neat Weight of 3 Hogſheads of Tobacco, weighing 15 *cwt.* 3 *qrs.* 20 *lb.* Groſs, Tare 7 *lb. per Cent.* Trett 4 *lb. per* 104. Cloff 2 *lb.* for 3 *cwt.*

*Anſ.* 14 *cwt.* 1 *qr.* 3 *lb.*

$7 = \frac{1}{16}$ 15..3..20 *Groſs.*
3..27 ½ *Tare.*

$\frac{1}{26}$ 14..3..20 ½ *Suttle.*
2.. 8 *Trett.*

14..1..12 ½ *Suttle.*
9 ½ *Cloff.*

14 .1.. 3 *Neat.*

72. In 7 Hogſheads of Tobacco, each weighing Groſs 5 *cwt.* 2 *qrs.* 7 *lb.* Tare 8 *lb. per Cent.* Trett 4 *lb. per* 104 *lb.* Cloff, 2 *lb. per* 3 *cwt.* how much neat Weight;

*Anſ.* 34 *cwt.* 2 *qrs.* 8 *lb.*

## APOTHECARIES WEIGHT.

73. In 27 *lb.* 7 ℥. 2 ʒ. 1 ℈. 2 *gr.* how many Grains?

*Anſ.* 159022.

74. How many *lb.* ℥. ʒ. ℈. 2 *grs.* are there in 159022 Grains. *Anſ.* 27 *lb.* 7 ℥. 2 ʒ. 1 ℈. 2 *grs.*

## CLOTH MEASURE.

75. In 27 Yards, how many Nails? *Anſ.* 432.

76. In 75 Ells of *Engliſh*, how many Yards? *Anſ.* 93 *yds.* 3 *qrs.*

77. In 93 ¾ Yards, how many *Engliſh* Ells? *Anſ.* 75.

78. In 24 Pieces, each containing 32 *Flemiſh* Ells, how many Ells *Engliſh*? *Anſ.* 460 *Ells*, 4 *qrs.*

79. In 17 Pieces of Cloth, each 27 Ells *Flemiſh*, how many Yards? *Anſ.* 344 *Yards*, 1 *qr.*

80. Bought 27 Pieces of *Engliſh* Stuffs, each 27 Ells, how many Yards? *Anſ.* 911 *Yards*, 1 *qr.*

81. In 911 ¼ Yards, how many *Engliſh* Ells? *Anſ.* 729.

82. In 12 Bales of Cloth, each 25 Pieces, each 15 Ells *Engliſh*, how many Yards? *Anſ.* 5625.

## LONG MEASURE.

83. In 57 Miles, how many Furlongs and Poles? *Anſ.* 456 *Furlongs*, 18240 *Poles.*

84. In 7 Miles, how many Feet, Inches, and Barley Corns? *Anſ*, 36960 *Feet*, 443520 *Inches*, 1330560 *Barley Corns.*

85. In 18240 Poles, how many Furlongs and Miles? *Anſ.* 456 *Furlongs*, 57 *Miles.*

86. In 72 Leagues, how many Yards? *Anſ.* 380160.

87. In 380169 Yards, how many Miles and Leagues? *Anſ.* 216 *Miles*, 72 *Leagues.*

88. If from *London* to *York* be accounted 50 Leagues, I demand how many Miles, Yards, Feet, Inches, and Barley Corns? *Anſ.* 150 *Miles*, 264000 *Yards*, 792000 *Feet*, 9504000 *Inches*, 28512000 *Barley Corns.*

89. How many Barley Corns will reach round the World, which is 360 Degrees, each Degree 69 Miles and an Half? *Anſ.* 4755801600 *Barley Corns.*

## LAND MEASURE.

90. In 27 Acres, how many Roods and Perches? *Anſ.* 108 *Roods*, 4320 *Perches.*

91. In 4320 Perches, how many Acres? *Anſ.* 27.

92. A Perſon having a Piece of Ground, containing 37 Acres, 1 Pole has a Mind to diſpoſe of 15 Acres to *A*, I deſire to know how many Perches he will have left? *Anſ.* 3521.

93. There are 4 Fields to be divided into Shares of 75 Perches each, the firſt Field containing 5 Acres, the ſecond 4 Acres, 2 Poles, the third 7 Acres, 3 Roods, and the fourth 2 Acres, 1 Rood, I deſire to know how many Shares are contained therein? *Anſ.* 40 *Shares*, 42 *Perches.*

## WINE MEASURE.

94. Bought 5 Tun of Port Wine, how many Gallons and Pints? *Anſ.* 1260 *Gallons*, 10080 *Pints.*

95. In 10080 Pints, how many Tuns? *Anſ.* 5.

96. In 5896 Gallons of Canary, how many Pipes and Hogſheads, and of each a like Number? *Anſ.* 31 *of each*, 37 *Gallons over.*

97. A Gentleman ordered his Butler to bottle off $\frac{2}{3}$ of a Pipe of *French* Wine into Quarts, and the reſt into Pints, I deſire to know how many Dozen of each he had?

*Anſ.* 28 *Dozen of each.*

## ALE *and* BEER MEASURE.

98. In 46 Barrels of Beer, how many Pints? *Anſ.* 13248.

99. In 10 Barrels of Ale, how many Gallons and Quarts?

*Anſ.* 320 *Gallons,* 1280 *Quarts.*

100. In 72 Hogſheads of Beer, how many Barrels?

*Anſ.* 108 *Barrels.*

101. In 108 Barrels of Beer, how many Hogſheads?

*Anſ.* 72.

## DRY MEASURE.

102. In 120 Quarters of Wheat, how many Buſhels, Pecks, Gallons, and Quarts?

*Anſ.* 960 *Buſhels,* 3840 *Pecks,* 7680 *Gallons,* 30720 *Quarts.*

103. In 30720 Quarts of Corn, how many Quarters?

*Anſ.* 120.

104. In 20 Chaldron of Coals, how many Pecks?

*Anſ.* 2880.

105. In 273 Laſts of Corn, how many Pecks? *Anſ.* 87360.

## TIME.

106. In 72015 Hours, how many Weeks?

*Anſ.* 428 *Weeks,* 4 *Days,* 15 *Hours.*

107. How many Days is it ſince the Birth of our Saviour to Chriſtmas 1755? *Anſ.* 641013 *Days,* 18 *Hours.*

108. *Stowe* writes, *London* was built 1108 Years before our Saviour's Birth, how many Hours is it ſince to Chriſtmas 1755? *Anſ.* 25097058 *Hours.*

109. From the 17th of *November* 1738, to the 12th of *September* 1739, how many Days? *Anſ.* 299.

110. From the 18th of *July* 1749, to the 27th of *December* the ſame Year, how many Days? *Anſ.* 162 *Days.*

111. From the 18th of *July* 1723, to the 18th of *April* 1750, how many Years and Days?

*Anſ.* 26 *Years,* 9770 *Days, reckoning* 365 *Days,* 6 *Hours, a Year.*

## *The* SINGLE RULE *of* THRRE DIRECT.

TEACHETH by three Numbers given to find out a fourth, in ſuch Proportion to the third, as the ſecond is to the firſt.

RULE. Firſt ſtate your Queſtion, *i. e.* place your Number in ſuch Order, that the firſt and third be of one kind, and the ſecond the ſame as the Number required, then bring your firſt and third Numbers into one Name, and the ſecond into its loweſt Term mentioned. Multiply your ſecond and third Numbers together, and divide the Product by the firſt, the Quotient will be the Anſwer to the Queſtion in the ſame Denomination you left your ſecond Number in.

### EXAMPLES.

1. If 1 *lb.* Sugar coſt 4*d.* ½. what coſt 54 *lb.*

1 : 4 ½ :: 54
4 18
18 4)972
12)243
20*s.* 3*d.*

*Anſ.* £1..–..3.

2. If a Gallon of Ale coſt 3*d.* what is that *per* Barrel? *Anſ.* 8*s.*

3. If a pair of Shoes coſt 4*s.* 6*d.* what will 12 Dozen come to? *Anſ.* £32..8. –.

4. If 12 Dozen Pair of Stockings coſt £32..8..–. what is that *per* Pair? *Anſ.* 4*s* 6*d.*

5 If 1 Yard of Cloth coſt 15*s.* 6*d.* what will 32 Yards coſt at the ſame Rate? *Anſ.* £24..16..–.

6. If 32 Yards of Cloth coſt £24..16..–. what is the Value of one Yard? *Anſ.* 15*s.* 6*d.*

7. If 1 *lb.* of Sugar coſt 10*d.* ½. what is the Worth of 1 *cwt* *Anſ.* £4..18..–.

8. If I gave £4..18..–. for 1 *cwt.* of Sugar, at what Rate did I buy it at *per lb.* *Anſ.* 10*d.* ½.

9. If I buy 20 Pieces of Cloth, each 20 Ells, for 12*s.* 6*d.* *per* Ell, what is the Value of the Whole? *Anſ* £250.

10. Bought 20 Pieces of Holland, each 20 Ells, for £250. what is that *per* Ell? *Anſ.* 12*s.* 6*d.*

11. What will 25 *cwt.* 3 *qrs.* 14 *lb.* of Tobacco come to at 15*d. per lb.?* *Anſ.* £187..3..3.

12. I gave £187..3..3. for 25 *cwt.* 3 *qrs.* 14 *lb.* of Tobacco, at what Rate did I buy it at *per lb?* *Anſ.* 15*d.* $\frac{1}{2}$.

13. Bought 27 Yards $\frac{1}{4}$ of Muſlin at 6*s.* 9*d.* $\frac{1}{2}$ *per* Yard, what does it amount to? *Anſ.* £9..5..– $\frac{3}{4}$. 2 *rem.*

14. Bought 17 *cwt.* 1 *qr.* 14 *lb.* of Iron, at 3*d.* $\frac{3}{4}$ *per lb.* what does it come to? *Anſ.* £26..7..–$\frac{1}{2}$.

15. If Coffee is ſold for 5*d.* $\frac{1}{2}$ *per* Ounce, what muſt be given for 2 *cwt?* *Anſ.* £82..2..8.

16. How many Yards of Cloth may be bought for £21..11..1 $\frac{1}{2}$. when 3 Yards $\frac{1}{2}$ coſt £2..14..3?
*Anſ.* 27 *Yards,* 3 *Quarters,* 1 *Nail,* 42 *rem.*

17. If 3 *lb.* $\frac{1}{2}$. of *Cheſhire* Cheeſe coſt 1*s.* 1*d.* what coſt 1 *cwt?* *Anſ.* £1..14..8.

18. If 1 *cwt.* of *Cheſhire* Cheeſe coſt 1..14..8. what muſt I give for 3 *lb.* $\frac{1}{2}$? *Anſ.* 1*s.* 1*d.*

19. Bought 1 *cwt.* 24 *lb.* 8 *oz.* of old Lead, at 9*s. per cwt.* what does it come to? *Anſ.* 10*s.* 11*d.* $\frac{1}{2}$. 112 *rem.*

20. If 1 *cwt.* 24 *lb.* 8 *oz.* of Lead be worth 10*s.* 11*d.* $\frac{1}{2}$. $\frac{112}{224}$. what is that *per cwt?* *Anſ.* 9*s.*

21. If a Gentleman's Income is £500. a Year, and he ſpends 19*s.* 4*d. per* Day, how much does he lay by at the Year's End? *Anſ.* £147..3..4.

22. If I buy 14 Yards of Cloth for 10 Guineas, how many Ells *Flemiſh* can I buy for £283..17..6. at the ſame Rate? *Anſ.* 504 *Fl. Ells,* 2 *Quarters.*

23. If £283..17..6. will buy 504 *Flemiſh* Ells, 2 Quarters, what Quantity of Yards can I have for £10..10..–.?
*Anſ.* 14 *Yards.*

24. If 504 *Flemiſh* Ells, 2 Quarters, coſt £283..17..6. at what Rate muſt I give for 14 Yards? *Anſ.* £10..10..–.

25. Gave £1..1..8. for 3 *lb.* of Coffee, what muſt be given for 29 *lb.* 4 *oz?* *Anſ.* £10..11..3.

26. Bought 29 *lb.* 4 *oz.* of Coffee, for £10..11..3. what is the Value of 3 *lb?* *Anſ.* £1..1..8.

27. If 1 *oz.* $\frac{1}{2}$ of Coffee coſt 6*d.* $\frac{1}{4}$ what will 3 *oz.* $\frac{1}{4}$ coſt at that Rate? *Anſ.* 1*s.* 1*d.* $\frac{1}{2}$. 1 *rem.*

28. If 1 Ell *Engliſh,* 2 Quarters, coſt 4*s.* 7*d.* what will 39 Yards one Half coſt at the ſame Rate? *Anſ.* £5..3..5. $\frac{1}{4}$.

29. If 1 Ounce of Gold is worth £5..4..2 what is the Worth of 1 Grain? *Anſ.* 2*d.* $\frac{1}{2}$. 20 *rem.*

30. If 14 Yards of Broad Cloth coſt £9..12..–.. what is the Purchaſe of 75 Yards? *Anſ.* £51..8..6. $\frac{3}{4}$. 6 *rem.*

31. If 27 Yards of Holland coſt £5..12..6. how many Ells *Engliſh* can I buy for £100? *Anſ.* 384.

32. If 1 *cwt.* coſt £12..12..6. what muſt I give for 14 *cwt.* 1 *qr.* 19 *lb.*? *Anſ.* £182..–..11. ½. 58 *rem.*

33 Bought 7 Yards of Cloth for 17*s.* 8*d.* what muſt be given for 5 Pieces, each containing 27 Yards ½?

*Anſ.* £17..7..–. ½ 2 *rem.*

34. If 7 *oz.* 11 *dwt.* of Gold be worth £35. what is the Value of 14 *lb.* 9 *oz.* 12 *dwt.* 16 *gr.* at the ſame Rate?

*Anſ.* £123..9..3 ¾. 552 *rem.*

35. A Draper bought 420 Yards of Broad Cloth at the Rate of 14*s.* 10*d.* ¾ *per* Ell *Engliſh*, how much did he pay for the Whole? *Anſ.* £250..5..–.

36. A Gentleman bought a Wedge of Gold, which weighed 14 *lb.* 3 *oz.* 8 *dwt.* for the Sum of £514..4..–. at what Rate did he pay for it *per* Ounce? *Anſ.* £3.

37. A Grocer bought 4 Hogſheads of Sugar, each weighing neat 6 *cwt.* 2 *qrs.* 14 *lb.* which coſt him £2..8..6. *per cwt.* what is the Value of the 4 Hogſheads?

*Anſ.* £64..5..3.

38 A Draper bought 8 Packs of Cloth, each containing 4 Parcels, each Parcel 10 Pieces, and each Piece 26 Yards, and gave after the Rate of £4..16..–. for 6 Yards, I deſire to know what the 8 Packs ſtood him in? *Anſ.* £6656.

39. If 24 *lb.* of Raiſins coſt 6*s.* 6*d.* what will 18 Frails coſt, each weighing neat 3 *qrs.* 18 *lb.*? £24..17..3.

40. If 1 *oz.* of Silver be worth 5*s.* what is the Price of 14 Ingots, each weighing 7 *lb.* 5 *oz.* 10 *dwt.*? *Anſ.* £313..5.

41. What is the Price of a Pack of Wool weighing 2 *cwt.* 1 *qr.* 19 *lb.* at 8*s.* 6*d.* *per* Stone? *Anſ.* £8..4..6 ¼. 10 *rem.*

42. Bought 59 *cwt.* 2 *qrs.* 24 *lb.* of Tobacco, at £2..17..4. *per cwt.* what does it come to? *Anſ.* £171..3..7 ¼. 80 *rem.*

43. What is the half Year's Rent of 547 Acres of Land, at 15*s.* 9*d.* *per* Acre *per Annum*? *Anſ.* £211..19..3.

44. Bought 171 Ton of Lead, at £14 *per* Ton, paid Carriage, and other incident Charges, £4..10..–. I require the Value of the Lead, and what it ſtands me in *per lb.*

*Anſ.* £2398..10..–. *Value.* 1*d.* ½. 432 *rem.* *per lb.*

45. If a Pair of Stockings coſt 10 Groats, how many Dozen may I buy for £43..5..–? *Anſ.* 21 *Doz.* 7 *Pair* ½.

46. Bought 27 Dozen, 5 *lb.* of Candles, after the Rate of 17*d.* *per* 3 *lb.* what did they coſt me?

*Anſ.* £7..15..4 ¼. 1 *rem.*

47. If an Ounce of fine Gold is ſold for £3..10..–. what comes 7 Ingots to, each weighing 3 *lb.* 7 *oz.* 14 *dwt.* 21 *gr.* at the ſame Price ? *Anſ.* £1071..14..5 ¼.

48. If my Horſe ſtands me in 9*d.* ½ *per* Day keeping, what will be the Charge of 11 Horſes for the Year ? *Anſ.* £158..18..6 ½.

49. A Factor bought 86 Pieces of Stuff, which coſt him £517..19.4. at 4*s.* 10*d. per* Yard, I demand how many Yards there were, and how many Ells *Engliſh*, in one Piece ? *Anſ.* 2143 *Yards* ¼, 14 *rem. and* 19 *Ells*, 4 *Quarters* 2 *Nails*, 64 *rem. in a Piece.*

50. A Gentleman hath an Annuity of £896..7..–. *per Annum*, I deſire to know how much he may ſpend daily, that at the Year's End he may lay up 200 Guineas, and give to the Poor quarterly 10 Moidores ? *Anſ.* £1..14.8. 44 *rem.*

## *The* RULE *of* THREE INVERSE.

INVERSE PROPORTION is, when *more* requires *leſs*, and *leſs* requires *more*. *More* requires *leſs*, is when the third Term is *greater* than the *firſt*, and requires the *fourth Term* to be *leſs* than the *ſecond*. And *leſs* requires *more*, is when the *third* Term is *leſs* than the *firſt*, and requires the *fourth* Term to be *greater* than the *ſecond*.

RULE. Multiply the firſt and ſecond Terms together, and divide the Product by the third, the Quotient will bear ſuch Proportion to the Second as the Firſt does to the Third.

EXAMPLES

1. If 8 Men can do a Piece of Work in 12 Days, how many Days can 16 Men perform the ſame in ? *Anſ.* 6 *Days.*

8 : 12 : : 16 : 6
8

---

16)96(6 *Days.*

2. If 54 Men can build a Houſe in 90 Days, how many Men can do the ſame in 50 Days ? *Anſ.* 97 *Men.*

3. If when a Peck of Wheat is ſold for 2*s.* the Penny Loaf weighs 8 *oz.* how much will it weigh when the Peck is worth but 1*s.* 6*d?* *Anſ.* 10 *oz.* 13 *dwt.* 8 *gr.*

4. How many Pieces of Money of 20*s.* Value are equal to 240 Pieces of 12*s.* each ? *Anſ.* 144.

5. How many Yards of 3 Quarters wide are equal in Meaſure to 30 Yards of 5 Quarters wide? *Anſ.* 50.

6. If I lend my Friend £200. for 12 Months, how long ought he to lend me £150. to requite my kindneſs? *Anſ.* 16 Months.

7. If for 24*s.* I have 1200 *lb.* carried 36 Miles, how many Pounds can I have carried 24 Miles for the ſame Money. *Anſ.* 1800 *lb.*

8. If 100 Workmen finiſh a Piece of Work in 12 Days, how many are ſufficient to do it in 3 Days? *Anſ.* 400.

9. An Army beſieging a Town, in which were 1000 Soldiers, with Proviſion for 3 Months, how many Soldiers departed when the Proviſions laſted them 6 Months? *Anſ.* 500.

10. If £20. worth of Wine is ſufficient to ſerve an Ordinary of 100 Men, when the Tun is ſold for £30. how many will £20. worth ſuffice, when the Tun is ſold for but £24? *Anſ.* 125 Men.

11. A Courier makes a Journey in 24 Days, when the Day is but 12 Hours long, how many Days will he be going the ſame Journey, when the Days are 16 Hours long? *Anſ.* 18 Days.

12. How much Pluſh is ſufficient for a Cloak, which has in it 4 Yards of 7 Quarters wide of Stuff for the Lining, the Pluſh being but 3 Quarters wide? *Anſ* 9 *Yards* $\frac{1}{3}$.

13. If 14 Pioneers make a Trench in 18 Days, how many Days will 34 take to do the ſame? *Anſ.* 7 *Days*, 4 *Hours*, 56 *Minutes*, 16 *rem.*

14. Borrowed of my Friend £64. for 8 Months, and he hath Occaſion another Time to borrow of me for 12 Months, how much muſt I lend him to requite his former Kindneſs to me? *Anſ.* £42..13..4.

15. A Regiment of Soldiers conſiſting of 1000 Men are to have new Coats, each Coat to contain 2 Yards $\frac{1}{2}$ of Cloth 5 Quarters wide, and to be lined with Shalloon of 3 Quarters wide, I demand how many Yards of Shalloon will line them? *Anſ.* 4166 *Yards*, 2 *Quarters*, 2 *Nails*, 2 *rem.*

# *The* DOUBLE RULE *of* THREE.

IS ſo called, becauſe it is compoſed of 5 Numbers given to find a ſixth, which if the Proportion is *direct*, muſt bear ſuch Proportion to the 4th and 5th, as the 3d bears to the 1ſt and 2d. But if *inverſe*, the 6th Term muſt bear ſuch Proportion to the 4th and 5th, as the firſt bears to the 2d and 3d. The three firſt Terms are a Suppoſition, the two laſt a Demand

RULE 1. Let the principal Cauſe of *Loſs* or *Gain*, *Intereſt* or *Decreaſe*, *Action* or *Paſſion*, be put in the firſt Place.

2. Let that which betokeneth *Time*, *Diſtance* of Place, and the like, be in the ſecond Place, and the remaining one in the third.

3. Place the other two Terms under their like in the Suppoſition.

4. If the *Blank* falls under the *third* Term, multiply the *firſt* and *ſecond* Terms for a *Diviſor*, and the other *three* for a *Dividend*. But,

5. If the *Blank* falls under the *firſt* and *ſecond* Term, multiply the *third* and *fourth* Terms for a *Diviſor*, and the other three for the *Dividend*, and the Quotient will be the *Anſwer*,

PROOF by two ſingle Rules of Three.

### EXAMPLES.

1. If 14 Horſes eat 56 Buſhels of Oats in 16 Days, how many Buſhels will be ſufficient for 20 Horſes 24 Days.

| *By two ſingle Rules,* | *or in one Stating.* | *Worked thus,* |
|---|---|---|
| *Hor. Bu. Hor. Bu.* | *Ho. Days. Bu.* | |
| 1. *As* 14 : 56 :: 20 : 80 | 14 : 16 : 56 | $\frac{56\times20\times24}{14\times16}=120$ |
| *Days Bu. Days. Bu.* | 20 : 24 : — | |
| 2. *As* 16 : 80 :: 24 : 120 | | |

2. If 8 Men in 14 Days can mow 112 Acres of Graſs, how many Men muſt there be to mow 2000 Acres in 10 Days?

| | | |
|---|---|---|
| *Acres. Days. Acres. Days.* | *M. D. Acres.* | |
| 1. *As* 112 : 14 :: 2000 : 250 | 8 : 14 : 112 | $\frac{8\times14\times2000}{112\times10}=200$ |
| *Days. Men. Days. Men.* | | |
| 2. *As* 250 : 8 :: 10 : 200 | — : 10 : 2000 | |

3. If £100. in 12 Months gain £6. Intereſt, how much will £75. gain in 9 Months? *Anſ.* £3..7..6.

4. If a Carrier receives £2..2..–. for the Carriage of 3 *cwt.* 150 Miles, how much ought he to receive for the Carriage of 7 *cwt.* 3 *qrs.* 14 *lb.* 50 Miles? *Anſ.* £1..16..9.

5. If a Regiment of Soldiers, conſiſting of 136 Men, conſume 351 Quarters of Wheat in 108 Days, how many Quarters of Wheat will 11232 Soldiers conſume in 56 Days? *Anſ.* 15031,

6. If 40 Acres of Graſs be mowed by 8 Men in 7 Days, how many Acres can be mowed by 24 Men in 28 Days? *Anſ.* 480.

7. If 40*s.* will pay 8 Men for 5 Days Work, how much will pay 32 Men for 24 Days Work? *Anſ.* £38..8..–.

8. If £100. in 12 Months gain £6. Intereſt, what Principal will gain £3..7..6. in 9 Months? *Anſ.* £75.

9. If a Regiment conſiſting of 939 Soldiers conſume 351 Quarters of Wheat in 168 Days, how many Soldiers will conſume 1404 Quarters in 56 Days? *Anſ.* 11268.

10. In a Family conſiſting of 7 Perſons, there are drank out 2 Kilderkins of Beer in 12 Days, how many Kilderkins will there be Drank out by another Family of 14 Perſons in 8 Days? *Anſ.* 2 *Kilderkins*, 12 *Gallons.*

11. If the Carriage of 60 *cwt.* 20 Miles coſt £14..10..–, what weight can I have carried 30 Miles for £5..8..9. at the ſame Rate of Carriage; *Anſ.* 15 *cwt.*

12. If 2 Horſes eat 8 Buſhels of Oats in 16 Days, how many Horſes will eat up 3000 Quarters in 24 Days? *Anſ.* 4000.

13. If £100. in 12 Months gain £7. Intereſt, what is the Intereſt of £571. for 6 Years; *Anſ.* £239..16..4$\frac{1}{4}$

14. If I pay 10*s.* for the Carriage of 2 Ton 6 Miles, what muſt I pay for the Carriage of 12 Ton, 17 *cwt.* 17 Miles? *Anſ.* £9..2..–$\frac{1}{2}$

## PRACTICE.

IS ſo called from the general Uſe thereof by all Perſons concerned in Trade and Buſineſs.

All Queſtions in this Rule are performed by taking aliquot or even Parts, by which Means many tedious Reductions are avoided, the Table of which is as follows:

| Of a Pound. | Of a Shilling. | Of a Tun. | Of an Hundred. |
|---|---|---|---|
| s. d. | d. | cwt. | qrs. lb. |
| 10.. - - is - ½ | 6 - is - - ½ | 10 - is - - ½ | 2 or 56 - is ½ |
| 6..8 - - - ⅓ | 4 - - - - - ⅓ | 5 - - - - ¼ | 1 or 28 - - ¼ |
| 5.. - - - - ¼ | 3 - - - - - ¼ | 4 - - - - ⅕ | 14 - - ⅛ |
| 4.. - - - - ⅕ | 2 - - - - - ⅙ | 2 ½ - - - ⅛ | Of a Quarter. |
| 3..4 - - - ⅙ | 1 ½ - - - - ⅛ | 2 - - - - $\frac{1}{10}$ | 14 - - - ½ |
| 2..6 - - - ⅛ | 1 - - - - $\frac{1}{12}$ | | 7 - - - - ¼ |
| 2.. - - - $\frac{1}{10}$ | | | 4 - - - - $\frac{1}{7}$ |
| 1..8 - - - $\frac{1}{12}$ | | | 3 ½ - - - ⅛ |

RULE 1. When the *Price* is leſs than a *Penny*, divide by the aliquot Parts that are in a *Penny*; then by 12 and 20, it will give the Anſwer.

| | | |
|---|---|---|
| ¼ is ¼ 5704 *lb.* at ¼<br>12)1426<br>2\|0)11\|8..10<br>£5..18..10 | 7695 at ½<br>*Anſ.* £16..–..7 ½ | 6547 at ¾<br>*Anſ.* £20..9..2 ¼ |
| | 5740 at ½<br>*Anſ.* £11..19..2 | 4573 at ¾<br>*Anſ.* £14..5..9 ¾ |

RULE 2. When the *Price* is leſs than a *Shilling* take the aliquot Part or Parts that are in a *Shilling* add them together, and divide them by 20, as before.

| | | |
|---|---|---|
| 1 is $\frac{1}{12}$ 7547 at 1*d.*<br>2\|0)62\|8..11<br>£31..8..11 | 6254 at 1*d* ¾<br>*Anſ.* £45..12..–..½ | 7062 at 3*d.* ¼<br>*Anſ.* £95..12..7½ |
| | 2351 at 2*d.*<br>*Anſ.* £19..11..10 | 2147 at 3*d.* ½<br>*Anſ.* £31..6..2 ½ |
| 1 is $\frac{1}{12}$ 3751 at 1*d*¼<br>¼ is ¼)312..7<br>78..1¾<br>2\|0)39\|0..8¾<br>£19..10..8 ¾ | 7210 at 2*d* ¼<br>*Anſ.* £67..11..10 ½ | 7000 at 3*d.* ¾<br>*Anſ.* £109..7..6 |
| | 2710 at 2*d.* ½<br>*Anſ.* £28..4..7 | 3257 at 4*d.*<br>*Anſ.* £54..5..8 |
| | 3250 at 2*d.* ¾<br>*Anſ.* £37..4..9 ½ | 2056 at 4*d.* ¼<br>*Anſ.* £36..8..2 |
| 54325 at 1*d* ½<br>*Anſ.* £339..10..7½ | 2715 at 3*d.*<br>*Anſ.* £33..18..9 | 3752 at 4*d* ½<br>*Anſ.* £70..7..–. |

| | | |
|---|---|---|
| 2107 at 4*d.* ¾<br>*Anſ.* £41 .. 14 .. –¼ | 3254 at 7*d.* ¼<br>*Anſ.* £98 .. 5 .. 11½ | 2150 at 9*d.* ¾<br>*Anſ.* £87 .. 6 .. 10½ |
| 3210 at 5*d.*<br>*Anſ.* £66 .. 17 .. 6 | 2701 at 7*d.* ½<br>*Anſ.* £84 .. 8 .. 1½ | 6325 at 10*d.*<br>*Anſ.* £263 .. 10 .. 10 |
| 2715 at 5*d.* ¼<br>*Anſ.* £59 .. 7 .. 9¾ | 3714 at 7*d.* ¾<br>*Anſ.* £119 .. 18 .. 7½ | 5724 at 10*d.* ¼<br>*Anſ.* £244 .. 9 .. 3 |
| 3120 at 5*d.* ½<br>*Anſ.* £71 .. 10 .. – | 2710 at 8*d.*<br>*Anſ.* £90 .. 6 .. 8 | 6327 at 10*d.* ¼<br>*Anſ.* £[illegible]70 .. 4 .. 3¾ |
| 7521 at 5*d.* ¾<br>*Anſ.* £180 .. 3 .. 9¾ | 3514 at 8*d.* ¼<br>*Anſ.* £120 .. 15 .. 10½ | 3254 at 10*d.* ½<br>*Anſ.* £142 .. 7 .. 3 |
| 3271 at 6*d.*<br>*Anſ.* £81 .. 15 .. 6 | 2759 at 8*d.* ½<br>*Anſ.* £97 .. 14 .. 3½ | 7291 at 10*d.* ¾<br>*Anſ.* £326 .. 11 .. 6¼ |
| 7914 at 6*d.* ¼<br>*Anſ.* £206 .. 1 .. 10½ | 9872 at 8*d.* ¾<br>*Anſ.* £359 .. 18 .. 4 | 3256 at 11*d.*<br>*Anſ.* £149 .. 4 .. 8 |
| 3250 at 6*d.* ½<br>*Anſ.* £88 .. – .. 5 | 5272 at 9*d.*<br>*Anſ.* £197 .. 14 .. – | 7254 at 11*d* ¼<br>*Anſ.* £340 .. – .. 7½ |
| 2708 at 6*d.* ¾<br>*Anſ.* £76 .. 3 .. 3 | 6325 at 9*d.* ¼<br>*Anſ.* £243 .. 15 .. 6¼ | 3754 at 11*d.* ½<br>*Anſ.* £179 .. 17 .. 7 |
| 3271 at 7*d.*<br>*Anſ.* £95 .. 8 .. 1 | 7924 at 9*d* ½<br>*Anſ.* £313 .. 13 .. 2 | 7972 at 11*d.* ¾<br>*Anſ.* £390 .. 5 .. 11 |

RULE 3. When the *Price* is more than a *Shilling*, and leſs than *two*, take [illegible] Part or Parts, with ſo much of the given *Price* as is more than a *Shilling*, which add to the given *Quantity*, and divide by 20, it will give the Anſwer.

| | | |
|---|---|---|
| ¼ $\frac{1}{48}$ 2106 at 12*d.* ¼<br>43 .. 10½<br>2\|0)214\|9 .. 10½<br>107 .. 9 .. 10½ | ½ $\frac{1}{24}$ 3715 at 12*d.* ½<br>154 .. 9½<br>2\|0)386\|9 .. 9½<br>193 .. 9 .. 9½ | 2712 at 12*d.* ¾<br>*Anſ.* £144 .. 1 .. 6<br>2107 at 1*s.* 1*d.*<br>*Anſ.* £114 .. 2 .. 7 |

3215

3215 at 1s. 1d. ¼
Anſ. £177..9..10¼

2790 at 1s. 1d. ½
Anſ. £156..18..9

7104 at 1s. 1d. ¾
Anſ. £4[illegible]2..16..8

3750 at 1s. 2d.
Anſ. £218..15..–

3291 at 1s 2d. ¼
Anſ. £195..8..0¾

9254 at 1s. 2d ½
Anſ. £559..1..11

7250 at 1s. 2d. ¾
Anſ. £445..11..5½

7591 at 1s. 3d.
Anſ. £474..8..9

6325 at 1s. 3d. ¼
Anſ. £401..18..–¼

5271 at 1s. 3d. ½
Anſ. £340..8..4½

3254 at 1s. 3d ¾
Anſ. £213..10..10½

2915 at 1s. 4d.
Anſ. £194..6..8

3270 at 1s. 4d. ¼
Anſ. £221..8..1½

7059 at 1s. 4d ½
Anſ. £485..6..1½

2750 at 1s. 4d. ¾
Anſ. £191..18..6½

3725 at 1s. 5d.
Anſ. £263..17..1

7250 at 1s. 5d. ¼
Anſ. £521..1..10½

2597 at 1s. 5d. ½
Anſ. £189..7..3½

7210 at 1s. 5d. ¾
Anſ. £533..4..9½

7524 at 1s. 6d.
Anſ. £564..6..–

7103 at 1s. 6d. ¼
Anſ. £540..2..5¾

3254 at 1s. 6d. ½
Anſ. £250..16..7

[illegible]5 at 1s. 6d. ¾
Anſ. £519..2..9¾

9271 at 1s. 7d.
Anſ. £733..19..1

7210 at 1s. 7d. ¼
Anſ. £578..6..–½

2310 at 1s. 7d. ½
Anſ. £187..13..9

2504 at 1s. 7d. ¾
Anſ. £206..1..2

7152 at 1s. 8d.
Anſ. £596..–..–

2905 at 1s. 8d. ¼
Anſ. £245..2..2¼

7104 at 1s. 8d. ½
Anſ. £606..16..–

1004 at 1s. 8d ¾
Anſ. £86..16..1

2104 at 1s. 9d.
Anſ. £184..2..–

2571 at 1s. 9d. ¼
Anſ. £227..12..9¾

2104 at 1s. 9d. ½
Anſ. £188..9..8

7506 at 1s. 9d. ¾
Anſ. £680..4..7½

1071 at 1s. 10d.
Anſ. £98..3..[illegible]

5200 at 1s. 10d. ¼
Anſ. £482..1..8

2117 at 1s. 10d. ½
Anſ. £198..9..4½

1007 at 1s. 10d. ¾
Anſ. £95..9..1¼

5000 at 1s. 11d.
Anſ. £479..3..4

2105 at 1s. 11d. ¼
Anſ. £203..18..5¼

1[illegible] at 1s. 11d. ½
Anſ. £98..10..1

2705 at 1s. 11d. ¾
Anſ. £267..13..7¾

5000 at 1s. 11d. ½
Anſ. £489..11..8

4000 at 1s. 11d. ¾
Anſ. £395..16..8

RULE 4. When the *Price* conſiſts of any even Number of *Shillings* under 20, multiply the given *Quantity* by Half the *Price*, doubling the firſt Figure of the Product for *Shillings*, and the reſt of the Product will be *Pounds*.

| | | |
|---|---|---|
| 2750 at 2*s.*<br>*Anſ.* £275 .. – .. – | 2102 at 10*s.*<br>*Anſ* £1051 .. – .. – | 1075 at 16*s.*<br>*Anſ.* £860 .. – .. – |
| 3254 at 4*s.*<br>*Anſ.* £650 .. 16 .. – | 2101 at 12*s*<br>*Anſ.* £1260 .. 12 .. – | 1621 at 18*s.*<br>*Anſ.* £1458 .. 18 .. – |
| 2710 at 6*s.*<br>*Anſ.* £813 .. – .. – | 5271 at 14*s.*<br>*Anſ.* £3689 .. 14 .. – | Note, *When the Price is* 10*s. take Half of the Quantity, and if any remains, it is* 10*s.* |
| 1572 at 8*s.*<br>*Anſ.* £628 .. 16 .. – | 3123 at 16*s.*<br>*Anſ.* £2498 .. 8 .. – | |

RULE 5. When the *Price* conſiſts of odd *Shillings*, multiply the given Quantity by the *Price*, and divide by 20, the Product will be the Anſwer.

| | | |
|---|---|---|
| 2703 at 1*s.*<br>*Anſ.* £135 .. 3 .. – | 2715 at 7*s.*<br>*Anſ.* £950 .. 5 .. – | 2150 at 15*s.*<br>*Anſ.* £1612 .. 10 .. – |
| 3270 at 3*s.*<br>3<br>2\|0)981\|0<br>£490 .. 10 .. – | 3214 at 9*s.*<br>*Anſ.* £1446 .. 6 .. – | 3142 at 17*s.*<br>*Anſ.* £2670 .. 14 .. – |
| | 2710 at 11*s.*<br>*Anſ.* £1490 .. 10 .. – | 2150 at 19*s.*<br>*Anſ.* £2042 .. 10 .. – |
| 3271 at 5*s.*<br>*Anſ.* £817 .. 15 .. – | 3179 at 13*s.*<br>*Anſ.* £2066 .. 7 .. – | 7157 at 19*s.*<br>*Anſ* £6799 .. 3 .. – |

RULE 6. When the *Price* is *Shillings*, and *Pence*, and they the aliquot Part of a *Pound*, divide by the aliquot Part, and it will give the Anſwer at once; but if they are not an aliquot Part, then multiply the *Quantity* by the *Shillings*, and take Parts for the reſt, add them together, and divide by 20,

| s. d. | | |
|---|---|---|
| 6.8 | ⅓ | 2710 at 6s. 8d. |
| | | £903 .. 6 .. 8 |

3150 at 3s. 4d.
*Anſ.* £525 .. – .. –

2715 at 2s. 6d.
*Anſ.* £339 .. 7 .. 6

7150 at s. 8d.
*Anſ.* £595 .. 16 .. 8

3215 at 1s. 4d.
*Anſ.* £214 .. 6 .. 8

7211 at 1s. 3d.
*Anſ.* £450 .. 13 .. 9

| d. | | |
|---|---|---|
| 2 | ⅙ | 2710 at 3s. 2d. |
| | | 3 |
| | | 8130 |
| | | 451 .. 8 |
| | | 858\|1 .. 8 |
| | 20 | |
| | | £429 .. 1 .. 8 |

7514 at 4s. 7d.
*Anſ.* £1721 .. 19 .. 2

2517 at 5s. 3d.
*Anſ.* £660 .. 14 .. 3

2547 at 7s. 3d. ½
*Anſ.* £928 .. 11 .. 10½

3271 at 5s. 9d. ¼
*Anſ.* £943 .. 16 .. 4¾

2103 at 15s. 3d. ½
*Anſ.* £1616 .. 13 .. 7½

7152 at 17s. 6d. ¾
*Anſ.* £6280 .. 7 .. –

2510 at 14s. 7d. ¼
*Anſ.* £1832 .. 16 .. 5½

3715 at 9s. 4d. ½
*Anſ.* £1741 .. 8 .. 1½

2572 at 13s. 7d. ½
*Anſ.* £1752 .. 3 .. 6½

7251 at 14s. 8d. ¾
*Anſ.* £5324 .. 19 .. –¾

3210 at 15s. 7d ¼
*Anſ.* £2511 .. 3 .. 1½

2710 at 19s. 2d. ½
*Anſ.* £2602 .. 14 .. 7

RULE 7. 1*ſt*. When the *Price* is *Pounds* and *Shillings*, multiply the Quantity by the *Pounds*, and proceed with the *Shillings*, if they are even, as in the 4th *Rule*; if odd, take the aliquot Parts, add them together, the Sum will be the Anſwer.

2*dly*, When *Pounds*, *Shillings* and *Pence*, and the *Shillings* and *Pence* the Aliquot Part of a *Pound* multiply the Quantity by the *Pounds*, and take Parts for the reſt.

3*dly*, When the *Price* is *Pounds*, *Shillings Pence* and *Farthings*, and the *Shillings* and *Pence* not the Aliquot Parts of a *Pound*, reduce the *Pounds* and *Shillings* into *Shillings*, multiply the Quantity by the *Shillings*, take Parts for the reſt, add them together, and divide by 20.

Note, *When the given Quantity is more than three Figures, proceed as in* Compound Multiplication.

| | | |
|---|---|---|
| 4 | $\frac{1}{5}$ | 7215 at £7..4..– |
| | | 7 |
| | | 50505 |
| | | 1443 |
| | | 51948 £. |
| s.d. | | |
| 2..6 | $\frac{1}{8}$ | 2104 at £5..3..– |
| | | 5 |
| | | 10520 |
| 6 | $\frac{1}{5}$ | 263 |
| | | 52..12 |
| | | 10835..12 |

2107 at £2..8..–
*Anſ.* £5056..16..–

7156 at £5..6..–
*Anſ.* £37926..16..–

| | | |
|---|---|---|
| 6 | $\frac{1}{2}$ | 2710 at £2..3..7$\frac{1}{2}$ |
| | | 43 |
| $1\frac{1}{2}$ | $\frac{1}{4}$ | 116530 |
| | | 1355 |
| | | 338..9 |
| | 2\|0 | 11822\|3..9 |
| | | £5911..3..9 |

3215 at £1..17..–
*Anſ.* £5947..15..–

2107 at £1..13..–
*Anſ.* £3476..11..–

3215 at £4..6..8
*Anſ* £13931..13..4

2154 at £7..1..3
*Anſ.* £15212..12..6

2701 at £2..3..4
*Anſ.* £5852..3..4

2715 at £1..17..2$\frac{1}{2}$
*Anſ.* £5051..–..7$\frac{1}{2}$

2157 at £3..15..2$\frac{1}{4}$
*Anſ.* £8108..19..5$\frac{1}{4}$

3210 at £1..18..6$\frac{3}{4}$
*Anſ.* £6189..5..7$\frac{1}{2}$

2157 at £2..7..4$\frac{1}{2}$
*Anſ* £5109..7..10$\frac{1}{2}$

142 at £1..15..2$\frac{3}{4}$
*Anſ.* £250..2..6$\frac{1}{2}$

95 at £15..14..7$\frac{1}{4}$
*Anſ* £1494..7..4$\frac{3}{4}$

37 at £1..19..5$\frac{3}{4}$
*Anſ.* £73..–..8$\frac{3}{4}$

2175 at £2..15..4$\frac{1}{2}$
*Anſ* £6022..–..7$\frac{1}{2}$

2150 at £7..16..1$\frac{1}{2}$
*Anſ* £16783..8..9

RULE 8. When the *Price* and Quantity given are of ſeveral *Denominations*, multiply the *Price* by the *Integers*, and take Part with the Parts of the *Integers* for the reſt.

At £3..17..6 *per Cwt.* what is the Value of 25 *cwt.* 2 *qrs.* 14 *lb.* of Tobacco?

```
qrs.
 2 | ½ | £3 .. 17 .. 6          5×5=25
   |   |              5
   |   |  ------------
   |   |   19 .. 7 .. 6
   |   |              5
   |   |  ------------
 lb.   |   96 .. 17 .. 6
 14| ¼ |    1 .. 18 .. 8
   |   |         9 .. 8¼
   |   |  ------------
   |   |   99 .. 5 .. 11¼
```

2. At £1..4. 9 *per Cwt.* what comes 17 *cwt.* 1 *qr.* 17 *lb.* of Cheeſe to? *Anſ.* £21..10..8.

3. Sold 85 *cwt.* 1 *qr.* 10 *lb.* of Cheeſe at £1..7..8. *per cwt.* what does it come to? *Anſ.* £118..1.–½

4. Hops at £4..5..8 *per Cwt.* what muſt be given for 72 *cwt.* 1 *qr.* 18 *lb?* *Anſ* £310..3..2.

5. At £1..1. 4. *per Cwt.* what is the Value of 27 *cwt.* 2 *qrs.* 15 *lb* of *Malaga* Raiſins? *Anſ.* £29. 9..6¼

6. Bought 78 *cwt.* 3 *qrs.* 12 *lb.* of *Currants.* at £2..17..9 *per cwt.* what did I give for the Whole? *Anſ.* £227..14..–.

7. Sold 56 *cwt.* 1 *qr.* 17 *lb.* of Sugar, at £2..15..9 the *Cwt.* what does it come to? *Anſ.* £157. 4..4½

8. Tobacco at £3..17..10 the *Cwt.* what is the worth of 97 *cwt.* 15 *lb?* *Anſ.* £378..–..3

9. At £4..14..6 the *Cwt.* what is the Value of 37 *cwt.* 2 *qrs.* 15 *lb.* of double refined Sugar? *Anſ.* £177. 14..8½

10. Bought Sugar at £3..14..6 the *Cwt.* what did I give for 15 *cwt.* 1 *qr.* 10 *lb?* *Anſ.* £57..2..9¼

11. At £4..15.. the *Cwt.* the Value of 172 *cwt.* 3 *qrs.* 12 *lb.* of Tobacco is required? *Anſ* £82.. 19..–¼

12. Soap at £3..11..6 the *Cwt.* what is the Value of 53 *cwt.* 17 *lb?* *Anſ.* £190..–..4.

IN-

# INTEREST.

INTEREST is either SIMPLE or COMPOUND.

## SIMPLE INTEREST.

IS the PROFIT allowed in the lending or Forbearance of any Sum of Money for a determined Space of *Time*.

The PRINCIPAL is the Money lent, for which *Intereſt* is to be received.

The RATE *per* CENT. is a certain *Sum* agreed on between the *Borrower* and the *Lender*, to be paid for every £100 for the uſe of the *Principal* 12 Months.

The AMOUNT is the *Principal* and *Intereſt* added together.

INTEREST is alſo applied to *Commiſſion*, *Brokage*, *Purchaſing of Stocks* and *Inſurance*.

*To find the Intereſt of any Sum of Money for a Year.*

RULE 1. Multiply the *Principal* by the *Rate per Cent.* that Product divided by 100, will give the Intereſt required.

*For ſeveral Years.*

Multiply the *Intereſt* of one *Year* by the Number of *Years* given in the Queſtion, and the Product will be the Anſwer.

EXAMPLES.

1. What is the Intereſt of £375 for a Year, at 5 *per Cent. per Annum*.

$$\begin{array}{r} 5 \\ \hline 18|75 \\ 20 \\ \hline 15|00 \end{array}$$

*Anſ.* £18..15..–.

2. What is the Intereſt of £268 for one Year at £4 *per Cent. per Annum?* *Anſ.* £10..14..4 $\frac{3}{4}$

3. What is the Intereſt of £945..10..–. for a Year, at £4 *per Cent. per Annum?* *Anſ.* £37..16..4 $\frac{3}{4}$

4. What is the Intereſt of £547..15..–. at 5 *per Cent. per Annum*, for three Years? *Anſ.* £82..3..3.

5. What is the Intereſt £25[illegible]..17..6 for 5 Years, at £4 *per Cent. per Annum?* *Anſ.* £50..19..5¾

6. What is the Intereſt of £556..13..4 at 5 *per Cent. per Annum*, for 5 Years? *Anſ.* £139..3..4.

## COMMISSION

Is an Allowance from *Merchants* to their *Factors* or *Correſpondents* in the buying or ſelling of Goods, and is generally at a certain *Rate per Cent.* according to the Cuſtom of the Country where the *Factor* reſides.

Rule. Multiply the *Principal* by the *Rate per Cent.* as before, and for ¼, ½, or ¾, take the *Part* or *Parts* from the *Principal* which add to the Product, and divide by 100, will give the Anſwer.

7. What is the Commiſſion of £287..10..–. at 3½ *per Cent.?*

½, ½, 287..10

3 *Anſ.* £10..1..3.

862..10 = 3

143..15 = ½

10|06..5 = 3½

20

1|25

12

3|00

8. What muſt I allow my Correſpondent for diſburſing on my Account £529..18..5. at 2¼ *per Cent?* *Anſ.* £11..18..5½

9. My Correſpondent writes me Word, that he has bought Goods to the amount of £754..16..–. on my Account, what does his Commiſſion come to at 2½ *per Cent?* *Anſ.* £18..17..4¾

10. If I allow my Factor 3¾ *per Cent.* for Commiſſion, what may I demand on the laying out of £876..5..10? *Anſ.* £32..17..2½

## PURCHASING *of* STOCKS.

Rule. Multiply the *Sum* to be purchaſed by the Exceſs, above 100, that Product divide by 100, the Produce of which added to the given *Sum* is the Purchaſe required.

If under *Par*, multiply by the *Rate per Cent.* that Product divided by 100, gives the *Purchaſe* thereof.

11. What is the Purchaſe of £575..10.–Bank Stock, at 131 ¾ *per Cent?*

```
      6×5+1=31

      575..10
            6
      -------
      3453
         5
      -------
½  ½  17265..–..–=30
      575..10..–=  1
¾  ½  287..15..–=      ½
      143..17..6=      ¼
      ---------------------
      182|72..2..6 = 31 ¾
          20
      -------
      14|42
          12
      -------
       5|10

575..10..–
182..14..5
----------
758..4..5 Answer.
```

12. What is the Purchaſe of £254..17..– Bank Annuities, at 97 ¼ *per Cent?*

```
      12×8+1=97

      254..17
           12
      -------
      3058..4
            8
      -------
¼  ¼  2446...12 –=96
      254..17..–= 1
      63..14..3=      ¼
      ----------   -----
      247|84..3..3=   97¼
          20
      -------
      16|83
          12
      -------
       9|99
          4
      -------
       3|96

£247..16..9 ¾ Anſwer.
```

13. At 110¼ *per Cent.* what is the Purchaſe of £2054..16..– South Sea Stock? *Anſ.* £2265..8. 4.

14. At £104 ⅜ *per Cent.* South Sea Annuities, what is the Purchaſe of £1797..14..–? *Anſ.* £1876. 6..11 ¾

15. What is the Purchaſe of £2750..17..–South Sea Old Annuities, at 102 ⅝ *per Cent?* *Anſ.* £2823..1..2 ¼

16. At £96 ¾ *per Cent.* what is the Purchaſe of £577..19..– Bank Annuities? *Anſ.* £559..3..3 ¾

17. At 124⅝ *per Cent.* what is the Purchaſe of £758..17..10 India Stock? *Anſ.* £945..15..4 ¼

BRO-

# BROKAGE.

Is an Allowance to *Brokers* for helping *Merchants* or *Factors* to Perſons to buy or ſell them Goods.

RULE. Divide the given Sum by 100, and take Parts from the Quotient with the *Rate per Cent.*

18. If I employ a Broker to ſell Goods for me to the Value of £2575..17..6. what is the Brokage at 4*s.* *per Cent*?

25|75..17..6
20
———
15|17
12
———
2|10

$4^s\frac{1}{5}$ 25..15..2
*Anſwer,* 5..3..–$\frac{1}{4}$

19. What is the Brokage of £796..14..7. at 6*s.* *per Cent*?
*Anſ.* £2..7..9$\frac{1}{2}$

20. When a Broker ſells Goods to the Amount of £7105..[illegible]..10. what may he demand for Brokage, if he is allowed 5*s.* 6*d.* *per Cent*?
*Anſ* £19..10..9$\frac{1}{4}$

21. If a Broker is employed to buy a Quantity of Goods to the Value of £975..6..4. what is the Brokage at 6*s.* 6*d.* *per Cent*?
*Anſ.* £3..3..4$\frac{1}{2}$

*When the Time is the $\frac{1}{4}$, $\frac{1}{2}$ or $\frac{3}{4}$ of a Year, beſides a Number of Years given.*

RULE. Take Parts of the *Intereſt* of one *Year*, which add to the *Intereſt* of the ſeveral *Years* given, and it will give the Anſwer.

22. What is the Intereſt of £554..10..–. for 3 Months, at 4 *per Cent. per Annum*?

554..10
4
———
22|18
20
———
3|60
12
———
7|20

*m*
3 $\frac{1}{4}$ 22..3..7
*Anſ.* 5..10..10$\frac{3}{4}$

23. What is the Intereſt of £336..15..6. for 2 Years $\frac{3}{4}$ at 5 *per Cent. per Annum*?

336..15..6
5
———
16|83..17..6
20
———
16|77
12
———
9|30
4
———
1|20

16..16..9$\frac{1}{4}$
2
———
33..13..6$\frac{1}{2}$
$\frac{1}{2}$ $\frac{1}{2}$ 8..8..4$\frac{1}{2}$
$\frac{1}{2}$ $\frac{1}{2}$ 4..4..2$\frac{1}{4}$
———
46..6..1$\frac{1}{4}$

24. What is the Intereſt of £325..7..6 at 6 *per Cent per Annum*, for 3 Years and a Half? *Anſ.* £68..6. 6 ¼

25. What is the Intereſt of £547..2..4. for 5 Years and a Half, at 4 *per Cent. per Annum?* *Anſ.* £120..7..3¼

26. What is the Intereſt of £257..5..1. at 4 *per Cent.* for 1 Year and three Quarters? *Anſ.* £18..–..1 ¼

27. What is the Intereſt of £479..5..– for 5 Years, one Quarter at 5 *per Cent. per Annum?* *Anſ.* £125..16..–¼

*When the Rate* per Cent. *is* ¼, ½, *or* ¾ *more than the Pounds given in the Rate*, proceed as in Commiſſion, and it will give the *Anſwer* for 1 *Year*, and for *ſeveral* proceed as in the laſt Rule.

28. What is the Intereſt of £175..17..– for 2 Years and 3 Quarters at 4 ½ *per Cent?*

½ ½ 175..17
4
703.. 8..–
87..18..6
7|91..6..6
20
[illegible]8 26
12
3|18

½ ½ 7..18..3
2
15..16..6
¼ ½ 3..19..1½
1..19..6¾
21..15..2¼ *Anſ.*

29. What is the Intereſt of £397..9..5 for 2 Years and 1 Quarter at 3 ½ *per Cent. per Annum?* *Anſ* £31..6..–.

30. What is the Intereſt of £576..2..7. for 7 Years one Quarter, 4 ½ *per Cent. per Annum?* *Anſ.* £187..19. 1½

31. What is the Intereſt of £279..13..8. at 5 ¼ *per Cent. per Annum*, for 3 Years and a Half? *Anſ* £51..7..10.

### *When the Intereſt is required for any Number of Weeks.*

**Rule.** As 52 *Weeks* are to the *Intereſt* of the given *Sum* for a Year: ſo are the Weeks given, to the Intereſt required.

32. What is the Intereſt of £379..13..2. for 4 Weeks, at 4 *per Cent. per Annum?*

*w* *w.*
As 52 : 15..3..8 ½ : : 4 :
20
303
12
3644
4
14578
4
4)
52)58312)1121
52
12)280 ¼
63
52
23..4 ¼
111
1..3..4 ¼
104
72
52
20

379..13..2
4
15|18..12..8
20
372
12
8|72
4
2|88

*Or thus: multiply by the Number of Weeks, and divide the Product by 4 and 13 being* 4×13=52 13) 15..3..8 ½
1..3..4 ¼

N. B. *As it is 4 Weeks, I don't multiply, but only divide by* 13.

33. What is the Intereſt of £259..13. 5. for 20 Weeks, at 5 *per Cent. per Annum?* *Anſ.* £4..19..10¼

34. What is the Amount of £375..6..1. for 12 Weeks, at 4 ½ *per Cent. per Annum?* *Anſ.* £379..4. 0¼

35. What is the Amount of £256..5..3. for 25 Weeks, at 2 ¾ *per Cent. per Annum?* *Anſ.* £259..13..–.

*When the Intereſt is for any Number of Days.*

RULE. Multiply the *Pence* of the *Principal* by the *Days* and *Rate per Cent.* for a Dividend, cut off two Figures on the Right-Hand, and divide by 365, the Quotient will be the Anſwer in Pence. Or,

As 365 *Days*: are to the *Intereſt* of the given Sum for a Year, : : ſo are the *Days* given : to the *Intereſt* required.

36. What is the Intereſt of £240 for 120 Days at 4 *per Cent. per Annum.*

```
     240        240 |   As 365 : 9..12 :: 120:
     240          4 |           20
 -------       ---- |          ---
   57600       9|60 |          192
     120         20 |          120
 -------       ---- |       ------  2|0)
 6912000      12|00 |    365)23040(6|3
       4            |         2190  -------
 ------- -  12)     |       ------  3..3..1¼
365)276480|00(757   |         1140
  2555    ---       |         1095
  ----  2|0)6(3..1  |         ----
  2098  ----------  |           45
  1825      3·3·1¼  |           12
  ----              |         ----
  2730              |        )540(1
  2555              |         365
  ----              |         ----
   175              |          175
     4              |            4
  ----              |         ----
  )700(1            |        )700(1
   365              |         365
  ----              |         ----
   335              |          335
```

37. What is the Intereſt of £397..5..4. for 3 Years and 75 Days, at £5 *per Cent. per Annum?* *Anſ.* £63..13..5.

38. At £5 ½ *per Cent. per Annum*, what is the Intereſt of £985..2..7. for 5 Years 127 Days? *Anſ.* £289..15..3.

39. What is the Intereſt of £2726..1..4. at 4 ½ *per Cent. per Annum*, for 3 Years 154 Days? *Anſ.* £419..15..6½.

### *When the Amount, Time and Rate* per Cent. *given, to find the Principal.*

RULE. As the *Amount* of £100 at the *Rate* and *Time* given. is to £100 :: ſo is the *Amount* given : to the *Principal* required.

40. What

[illegible] to Intereſt will amount to £[illegible] 3 *per Cent. per Annum?*

[illegible] + 100=£.15 : 100 :: 402..10.

20 20

2300 8050
100

23|00)8050|00(£350 *Anſ.*

41. What Principal being put to Intereſt for 9 Years will amount to £734..8..— at 4 *per Cent. per Annum?* *Anſ.* £540.

42. What Principal being put to Intereſt for 7 Years at 5 *per Cent. per Annum*, will amount to £334..16.— *Anſ.* £248.

*When the Principal, Rate* per Cent. *and Amount are given to find the Time.*

RULE. As the *Intereſt* of the *Principal* for 1 Year : is to 1 Year :: ſo is the Whole *Intereſt* to the *Time* required.

43. In what Time will £350 amount to £402..10..—. at 3 *per Cent. per Annum?*

350
3

10|50
20

10|00

As 10..10 : 1 :: 52..10 : 5
20 20

210 21|0)105|0(5 *Anſ.*
105

...

402..10
350..—

52..10

44. In what Time will £540 amount to £734..8..—. at 4 *per Cent. per Annum?* *Anſ.* 9 *Years.*

45. In what Time will £248 amount to £334..16..—. at 5 *per Cent. per Annum?* *Anſ.* 7 *Years.*

*When the Principal Amount, and Time are given, to find the Rate* per Cent.

RULE. As the *Principal:* is to the *Intereſt* for the whole *Time* :: ſo is £100 : to the *Intereſt* for the ſame Time. Divide that *Intereſt* by the *Time*, and the *Quotient* will be the *Rate per Cent.*

46, At what *Rate per Cent.* will £350 amount to £402. 10..–. in 5 Years Time?

350 As 350 : 52..10 :: 100 : £15

52..10..–.

20

1050

100

3|50)1050|00(300 s. = £15 : 5 = 3 *per Cent.*

47. At what *Rate per Cent.* will £248. amount to £334..16.–. in 7 Years Time? *Anſ.* 5 *per Cent.*

48. At what *Rate per Cent.* will £540 amount to £734..8..–. in 9 Years Time? *Anſ.* 4 *per Cent.*

## *Compound* INTEREST.

Is that which ariſes both from the *Principal* and *Intereſt*, that is, when the *Intereſt* on Money becomes due, and not paid, the ſame *Intereſt* is allowed on that *Intereſt* unpaid, as was on the *Principal* before.

RULE 1. Find the firſt Years *Intereſt*, which add to the *Principal*, then find the *Intereſt* of that *Sum*, which add as before, and ſo on for a Number of Years.

2. Subtract the given *Sum* from the laſt *Amount*, and it will give the *Compound Intereſt* required.

### EXAMPLES.

1. What is the Compound Intereſt of £500 ſoreborne 3 Years, at 5 *per Cent. per Annum*?

500 500 525

5 25 26..5

25|00 525 *1ſt Year.* 551..5 *2d. Year.*

5 5 551..5

26|25 27|56..5 27..11..3

20 20

5|00 11|25 578..16..3 *3d Year.*

12 500 *Prin. ſubtra.*

3|00 78..16..3 = *Intereſt.* *for* 3 *Years.*

2. What is the Amount of £400 forborne 3 ½ Years, at 6 *per Cent. per Ann.* Compound Intereſt? *Anſ.* £490..13..11$\frac{3}{4}$

3. What will £650. amount to in 5 Years at 5 *per Cent. per Annum* Compound Intereſt? *Anſ.* £829 .. 11 .. 8.

4. What is the Amount of £550 .. 10 .. –. for 3 Years and 6 Months, at 6 *per Cent. per Annum*, Compound Intereſt? *Anſ.* £675 .. 6 .. 5¼

5. What is the Compound Intereſt of £764. for 4 Years and 9 Months, at £6. *per Cent. per Annum?* *Anſ.* £243 .. 18 .. 8½.

6. What is the Compound Intereſt of £57 .. 10 .. 6. for 5 Years, 7 Months, and 15 Days, at 5 *per Cent. per Annum?* *Anſ.* £18 .. 3 .. 8½

7. What is the Compound Intereſt of £259 .. 10 .. -. for 3 Years, 9 Months, and 10 Days, at 4½ *per Cent. per Annum?* *Anſ.* £ 46 .. 19 .. 10½.

## REBATE *or* DISCOUNT.

IS the abating of ſo much Money on a *Debt*, to be received before it is due, as that Money, if put to *Intereſt*, would gain in the ſame *Time*, and at the ſame *Rate*. As £100 preſent Money would diſcharge a Debt of £105 to be paid a Year to come, *Rebate* being made at 5 *per Cent*.

RULE. As £100 with the *Intereſt* for the *Time* given : is to that *Intereſt* : : ſo is the Sum given : to the *Rebate* required.

Subtract the *Rebate* from the given Sum, and the Remainder will be the *preſent Worth*.

### EXAMPLES.

1. What is the Diſcount and preſent Worth of £487 .. 12 .. – for 6 Months, at 6 *per Cent. per Annum*.

```
6 m. ½  6           As 103 : 3 :: 487..12
      ----                 20       20
                          ----   -------
         3                2060    9752
       100                           3
      ----                       -------  £.   s.
       103                  206|0)2925|6(14.. 4 Rebate.
                                   206
    487..12                       -----
     14.. 4                        865
    -------                        824
Anſ. 473.. 8..0 preſent Worth.    -----
                                   416=4s.
```

2. What is the preſent Payment of £357..10– which was agreed to be paid 9 Months hence, at 5 *per Cent. per Annum?*
*Anſ.* £344..11..7.

3. What is the Diſcount of £275..10..–. for 7 Months, at 5 *per Cent. per Annum?* *Anſ.* £7..16..1¾

4. Bought Goods to the Value of £109..10..–. to be paid at 9 Months, what preſent Money will diſcharge the ſame, if I am allowed 6 *per Cent. per Annum* Diſcount?
*Anſ.* £104..15..8½.

5. What is the preſent Worth of £527 .9 .1. payable 9 Months hence, at 4½ *per Cent?* *Anſ.* £514..13..10¼

6. What is the Diſcount of £85..10..–. due *September* the 8th, this being *July* 4th, Rebate, at 5 *per Cent. per Annum?*
*Anſ.* 15*s.* 3*d.* ½

7. Sold Goods for £875..5..6. to be paid 5 Months hence, what is the preſent Worth, at 4½ *per Cent.*
*Anſ* £859..3..4.

8. What is the preſent Worth of £500 payable in 10 Months, at 5 *per Cent per Annum?* *Anſ.* £480.

9. How much ready Money can I receive for a Note of £75 due 15 Months hence, at 5 *per Cent?* *Anſ.* £70..11..9¼.

10. What will be the preſent Worth of £150 payable at 3 four Months, *i. e.* one third at 4 Months, one third at 8 Months, and one third at 12 Months, at 5 *per Cent.* Diſcount?
*Anſ.* £145..3..9¼.

11. Sold Goods to the Value of £575..10..–. to be paid at two 3 Months, what muſt be diſcounted for preſent Payment? at 5 *per Cent.* *Anſ.* £10..11..4¾

12. What is the preſent Worth of £500 at 4 *per Cent.* £100 being to be paid down, and the reſt at two 6 Months?
*Anſ.* £488..7..9.

## EQUATION *of* PAYMENTS.

IS when ſeveral *Sums* are due at different *Times.* To find a *mean Time* for paying the whole *Debt,* to do which this is the common

Rule. Multiply each *Term* by its *Time,* and divide the *Sum* of the *Products* by the whole *Debt,* the Quotient is accounted the mean *Time.*

## EXAMPLES.

1. *A* owes *B.* £200. whereof £40. is to be paid at 3 Months, £60. at 5 Months, and £100. at 10 Months, at what Time may the whole Debt be paid together, without Perjudice to either?

£. m.
40 × 5 = 120
60 × 5 = 300
100 × 10 = 1000

2|00)14|20

7 *Months* $\frac{1}{10}$.

2. *B* owes *C* £800 whereof £200 is to be paid at 3 Months, £100 at 4 Months, £300 at 5 Months, and £200 at 6 Months: but they agreeing to make but one Payment of the Whole, I demand when that Time muſt be?
*Anſ.* 4 *Months*, 18 *Days.*

3. I bought of *K* a Quantity of Goods to the Value of £360 which was to have been paid as follows: £120 at 2 Month £200 at 4 Months, and the reſt at 5 Months: but we afterwards agreed to have it paid at one mean Time, that Time is demanded? *Anſ.* 3 *Months*, 13 *Days.*

4. A Merchant bought Goods to the Value of £500 to pay £100 at the End of 3 Months, £150 at the End of 6 Months, and £250 at the End of 12 Months; but afterwards they agreed to diſcharge the Debt at one Payment; at what Time was this Payment made;
*Anſ.* 8 *Months*, 12 *Days.*

5. *K* is indebted to *L* a certain Sum, which is to be paid at 6 different Payments, that is, 1 4th at two Months, 1 8th at 3 Months, 1 8th at 4 Months, 1 4th at 5 Months, 1 8th at 6 Months, and the reſt at 7 Months; but they agreed that the Whole ſhould be paid at one equated Time, what is that Time? *Anſ.* 4 *Months one Quarter.*

6. *A* is indebted to *B* £120 whereof $\frac{1}{2}$ is to be paid at 3 Months $\frac{1}{2}$ at 6 Months, and the reſt at 9 Months, what is the equated Time of the whole Payments?
*Anſ.* 5 *Months*, 7 *Days.*

BAR-

# BARTER.

IS the exchanging one Commodity for another, and informs the *Traders* ſo to proportion their Goods, that neither may ſuſtain *Loſs*.

RULE. *Firſt* find the Value of that *Commodity*, whoſe *Quantity is given*, then find what Quantity of the other, at the *Rate* propoſed, you may have for the ſame Money.

*2dly*, When one has Goods at a certain Price *ready Money*, but in *Bartering* advances it to ſomething more; find what the other ought to *Rate* his *Goods* at, in Proportion to that Advance, and then proceed as beſore.

EXAMPLES.

1. What Quantity of Chocolate, at 4*s. per lb.* muſt be delivered in Barter for 2 *cwt.* of Tea, at 9*s. per lb.*

2 Cwt.
112

224
9

2)2016 *the Value of the Tea.*

504 *lb. of Chocolate.*

2. *A* and *B* barter: *A* hath 20 *cwt.* of Prunes, at 4*d. per lb.* ready Money, but in Barter will have 5*d. per lb.* and *B* hath Hops worth 32*s. per cwt.* ready Money, what ought *B* to rate his Hops at in Barter, and what Quantity muſt be given for the 20 *cwt.* of Prunes?

As 4 : 5 :: 32 :
5

4(160

40 *S.*

112
20

*s.*
40 2240
12 5

*cwt. qr. lb.*
480)11200(23..1..9 $\frac{16}{48}$ *Anſ.*
96

160
144

16 = 1 *qr.* 1 *lb.* $\frac{16}{48}$

3. How much Tea at 9*s. per lb.* can I have in Barter for 4 *cwt.* 2 *qrs.* of Chocolate, at 4*s. per lb.*? *Anſ.* 2 *cwt.*

4. Two Merchants barter; *A* hath 20 *cwt.* of Cheeſe, at 21*s.* 6*d. per cwt.* *B* hath eight Pieces of *Iriſh* Cloth, at £3..14..–. *per* Piece. I deſire to know who muſt receive the Difference, and how much?

*Anſ. B muſt receive of A* £8..2..–.

5. *A.* and *B.* barter: *A* hath 3 $\frac{1}{2}$ *lb.* of Pepper, at 13*d.* $\frac{1}{2}$ *per lb. B.* hath Ginger, at 15*d.* $\frac{1}{4}$ *per lb.* how much Ginger muſt be delivered in Barter for the Pepper?

*Anſ.* 3 *lb.* 1 *oz.* $\frac{35}{61}$.

6. How many Dozen of Candles, at 5*s.* 2*d. per* Dozen, muſt be delivered in Barter for 3 *cwt.* 2 *qrs.* 16 *lb.* of Tallow, at 37*s.* 4*d. per Cwt.* *Anſ.* 26 *Doz* 3 *lb.*

7. *A* hath 608 Yards of Cloth worth 14*s. per* Yard, for which *B* giveth him £125..12..–. in ready Money, and 85 *cwt.* 2 *qrs.* 24 *lb.* Bees-Wax, the Queſtion is, what did *B* reckon his Bees-Wax at *per Cwt*? *Anſ.* £3..10..–.

8. *A.* and *B* barter: *A* hath 320 Dozen of Candles, at 4*s.* 6*d. per* Dozen, for which *B* giveth him £30. in Money, and the reſt in Cotton, at 8*d. per lb.* I deſire to know how much Cotton *B* gave *A* beſides the Money? *Anſ.* 11 *cwt.* 1 *qr.*

9. If *B* hath Cotton, at 1 *s.* 2 *d. per lb* how much muſt he give *A* for 114 *lb* of Tobacco, at 6*d. per lb.* *Anſ.* 48 *lb.* $\frac{12}{14}$.

10. *C* hath Nutmegs worth 7*s.* 6*d. per lb.* ready Money, but in barter will have 8*s. per lb.* and *D* hath Leaf Tobacco worth 9*d. per lb.* ready Money, how much muſt *D* rate his Tobacco at *per lb.* that his Profit may be equivalent with C's? *Anſ.* 9*d.* $\frac{136}{290}$.

## PROFIT *and* LOSS.

IS a Rule that diſcovers what is *got* or *loſt* in the buying or ſelling of *Goods*, and inſtructs us to riſe or fall the *Price*, ſo as to gain or loſe ſo much *per Cent.* or otherwiſe.

EXAMPLES.

1. If a Yard of Cloth is bought for 11*s.* and ſold for 12*s.* 6*d.* what is the Gain *per Cent?*

```
As 11 : 1..6 :: 100
        12      20
       ----    ----
        18     2000
                 18
12..6          ------
11..—       11)36000
-----          ------
 1..6        12)3272
               ------
            2|0)27|2..8
               ------
```

*Anſ.* 13..12..8 $\frac{8}{11}$

2. If 60 Ells of Holland coſt £18. what muſt 1 Ell be ſold for to gain £8 *per Cent?*

```
As 100 : 18 :: 108
             108
           -------          12×5=60
       1|00)19|44
              20           12)19..8..9½
            -----          -----------
             8|80           5)1..12..4¾
              12           -----------
            -----              ..6..5¾
             9|60
               4
            -----
             2|40   Anſ. 6s. 5d. ¾
```

3. If 1*lb.* of Tobacco coſt 16*d.* and is ſold for 20*d.* what is the Gain *per Cent?* *Anſ.* £25.

4. If a Parcel of Cloth be ſold for £560 and at £12 *per Cent.* Gain, what was the prime Coſt? *Anſ.* £500.

5. If a Yard of Cloth be bought for 13*s.* 4*d.* and ſold again for 16*s.* what is the Gain *per Cent?* *Anſ.* £20.

6. If 112*lb.* of Iron coſt 27*s.* 6*d.* what muſt 1 *cwt.* be ſold for, to Gain 15 *per Cent?* *Anſ.* £1..11..7 $\frac{1}{2}$

7. If 375 Yards of broad Cloth be ſold for £490 and 20 *per Cent.* Profit, what did it coſt *per* Yard? *Anſ.* £1..1..9 $\frac{1}{4}$

8. Sold 1 *cwt.* of Hops for £6..15..—. at the Rate of £25 *per Cent.* Profit, what would have been the Gain *per Cent.* if I had ſold them for £7 *per cwt?* *Anſ.* £29..12..7

9. If 90 Ells of Cambrick coſt £60. how muſt I ſell it *per* Yard to Gain £18 *per Cent?* *Anſ.* 12*s* 7*d.*

10. A Plummer ſold 10 Fother of Lead for £204..15..— (the Fother being 19 *cwt* $\frac{1}{2}$) and gained after the Rate of £12..10..— *per Cent.* what did it coſt him *per cwt?* *Anſ.* 18*s.* 8*d.*

11. Bought 436 Yards of Cloth, at the Rate of 8*s.* 6*d.* *per* Yard, and ſold it for 10*s.* 4*d.* *per* Yard, what was the Gain of the Whole? *Anſ.* £39..19..4.

12. Paid £69 for one Ton of Steel, which is retailed at 6*d.* *per lb.* what is the Profit or Loſs by the Sale of 14 Tons? *Anſ.* £182. *Loſs.*

13. Bought 124 Yards of Linen for £32 how ſhould the ſame be retailed *per* Yard to gain £15 *per Cent?*

*Anſ.* 5*s.* 11*d.* $\frac{28}{124}$.

14. Bought 249 Yards of Cloth at 3*s.* 4*d. per* Yard, retailed the ſame at 4*s.* 2*d. per* Yard, what is the Profit in the whole, and how much *per Cent?*

*Anſ.* £10..7..6. *Profit, and* £25 *per Cent.*

# FELLOWSHIP.

IS when two or more join their *Stocks* and Trade together, ſo to determine each perſon's particular *Share* of the *Gain* or *Loſs*, in proportion to his *Principal* in the Joint *Stock*.

*By this Rule a Bankrupt's Eſtate may be divided amongſt his Creditors, as alſo Legacies may be adjuſted when there is a Deficiency of Aſſets or Effects.*

FELLOWSHIP *is either with or without* TIME.

## FELLOWSHIP *without* TIME.

RULE. As the whole *Stock* : is to the whole *Gain* and *Loſs* : : ſo is each Man's *Share* in *Stock* : to his *Share* of the *Gain* or *Loſs*.

PROOF. Add all the Shares together, and the Sum will be equal to the given *Gain* or *Loſs*;—but the ſureſt Way is. As the whole *Gain* or *Loſs*; is to the whole *Stock* : : ſo is each *Man's Share* of the *Gain* or *Loſs* : to his *Share* in *Stock*.

### EXAMPLES.

1. Two Merchants trade together; *A* put into Stock £20 and *B* £40 they gained £50 what is each Perſon's Share thereof?

20 × 40 = 60

As 60 : 50 : : 20 As 60 : 50 : : 40 33 .. 6 .. 8 B's *Shares*

20 40 16 .. 13 .. 4 A's.

(60)1000 (60)2000 50

£16 .. 13 .. 4. £33 .. 6. 8.

2. Three Merchants trade together, *A*, *B*, and *C*; *A* put in £20. *B* £30. and C £40. they gained £180. what is each Man's Part of the Gain? *Anſ.* A £40. B £60. C £80.

3. *A*, *B*, and *C* enter into Partnerſhip; *A* puts in £364. *B* £482. and *C* £500. and they gained £867. what is each Man's Share in Proportion to his Stock?
*Anſ.* A £234 .. 9 .. $3\frac{1}{4}$ *rem* 70. B £310..9 .. 5.—*rem* 248. C £322..1..3 $\frac{1}{2}$ *rem.* 1028.

4. Four Merchants, *B*, *C*, *D*, and *E* made a Stock; *B* puts in £227. *C* £349. *D* £115. and *E* £439. in trading they gained £428. I demand each Merchant's Share of the Gain?
*Anſ.* B £85 .. 19 .. 6 $\frac{3}{4}$ 690. C £132 .. 3 .. 9.—120. D £43..11..1. $\frac{3}{4}$ 250. E £166..5..6 $\frac{1}{4}$ 70

5. Three Perſons, *D*, *E* and *F*, join in Company; *D*'s Stock was £750. *E*'s £460. and *F*'s £500. and at the End of 12 Months they gained £684. what is each Man's particular Share of the Gain?
*Anſ.* D £300. E £184. and F £200.

6. A Merchant is indebted to *B* £275 .. 14 ..–. to *C* £304 .. 7 .. –. to *D*, 152. and to *E* £104 .. 6.. –. but upon his Deceaſe, his Eſtate is found to be worth but £675..15..– how muſt it be divided amongſt his Creditors?
*Anſ.* B £222..15..2--6584 C's £245..18..1 $\frac{1}{2}$ 15750. D's 122..16..2 $\frac{3}{4}$ 12227. and E's £84..5..5--15620.

7. Four Perſons trading together in a Joint Stock of which *A* has $\frac{1}{3}$, *B* $\frac{1}{4}$, *C* $\frac{1}{5}$, and *D* $\frac{1}{3}$, and at the End of 6 Months, they gain £100. what is each Perſon's Share of the ſaid Gain?
*Anſ.* A £35..1..9—48. B £26..6..3 $\frac{3}{4}$ 36. C £21..1..– $\frac{1}{2}$ 120. and D £17..10..10 $\frac{1}{2}$ 24.

8. Two Perſons purchaſed an Eſtate of £1700. *per Annum* Freehold for £27200. when Money was at 6 *per Cent.* Intereſt. and 4*s.* *per* £. Land Tax, whereof *D* paid £15000. and *E* the reſt; ſome Time after the Intereſt of Money falling to 5 *per Cent.* and 2*s.* *per* £ Land Tax, they ſell the ſaid Eſtate for 24 Years Purchaſe, I deſire to know each Perſon's Share?
*Anſ.* D £22500. E £18300.

9. *D*, *E*, and *F*, join Stocks in Trade; the Amount of their Stocks is £647 and are in Proportion as 4, 6 and 8 is to one another, and the Amount of their Gain is equal to *D*'s Stock, what is each Man's Stock and Gain? *Anſwer*,
D's *Stock*, £143 .. 15 .. $6\frac{1}{2}$ $\frac{2}{3}$ *Gain*, £31 .. 19 .. – 184036.
E's - - - 215 .. 13 .. 4 47 .. 18 .. 6. 4 4080.
F's - - - - 287 .. 11 .. 1 $\frac{1}{4}$ $\frac{1}{3}$ 63 .. 18 .. –. 505098.

10. *D*, *E* and *F* join Stocks in Trade, the Amount of their Stocks was £100. *D*'s Gain £3. *E*'s £5. and *F*'s £8. what was each Man's Stock ?

*Anſ.* D's Stock £18..15..–. E's £31..5 *and* F's £50.

## FELLOWSHIP *with* TIME.

**RULE.** As the *Sum* of the *Products* of each Man's *Money* and *Time* : is to the whole *Gain* or *Loſs* : ſo is each Man's *Product* : to his *Share* of the *Gain* or *Loſs*.

**PROOF.** As in *Fellowſhip* without *Time*.

### EXAMPLES.

1. *D*, and *E* enter into Partnerſhip ; *D* put in £40. for three Months, and *E* £75. for four Months, and they gained £70. what is each Man's Share of the Gain ? *Anſ.* D £20. E £50.

```
40×3=120      As 420 : 70 :: 120      As 420 : 70 :: 300
75×4=300                     120                      300
     ———                     ———                      ———
     420               42|0)840|0              42|0)2100|0
                             ———                      ———
                              20                       50
```

2. Three Merchants join in Company, *D* puts in Stock £195..14..–. for 3 Months, *E* £169..18..3. for 5 Months, and *F* £59..14..10. for 11 Months, and they gained £36..18..–. what is each Man's Part of the Gain ?
*Anſ.* D's £102..6..4 — 5008. E's £148..1..1 ½ 482802. and F's £114..10..6 ¼ 14707.

3. Three Merchants join in Company for 18 Months, *D* put in £500. and at 5 Months End took out £200. at 10 Months End puts in £300. and at the End of 14 Months takes out £130. *E* puts in £400. and at the End of 3 Months £270. more, at 9 Months he takes out £140 but puts in £100. at the End of 12 Months, and withdraws £99. at the End of 15 Months ; *F* puts in £900. and at 6 Months took out £200. at the End of 11 Months puts in £500 but takes out that and £100. more at the End of 13 Months ; they gained £200. I deſire to know each Man's Share of the Gain ? *Anſ*, *D* £50..7..6,—21720. *E* £62..12..5 ¾ 29859 *and* *F* £87..–..– ¼. 14167.

4. *D*, *E* and *F* hold a Piece of Ground in common, for which they are to pay £36..10..6 *D* puts in 23 Oxen 27 Days, *E* 21 Oxen 35 Days, and *F* 16 Oxen 23 Days, what is each Man to pay of the ſaid Rent? *Anſwer*, D £13 .. 3 .. 1 ½ 624. E £15 .. 11 .. 5 -- 1688. *and* F £7..15..11 — 1136.

# ALLIGATION.

## Alligation *is either* Medial *or* Alternate.

## Alligation Medial.

IS when the *Price* and *Quantities* of ſeveral *Simples* are given to be mixed, to find the *mean Price* of that Mixture.

Rule As the whole *Compoſition* : is to its total *Value* :: ſo is any Part of the *Compoſition* : to its *mean Price*.

Proof. Find the Value of the whole Mixture at the *mean Rate*, and if it agrees with the *total Value* of the ſeveral *Quantities* at their reſpective *Prices*, the Work is right.

### Examples.

1. A Farmer mixed 20 Buſhels of Wheat, at 5*s.* *per* Buſhel, and 36 Buſhels of Rye, at 3*s* *per* Buſhel, with 40 Buſhels of Barley, at 2*s.* *per* Buſhel. I deſire to know the Worth of a Buſhel of this Mixture?

$$\begin{array}{l} 20\times5=100 \\ 36\times3=108 \\ 40\times2=\ \ 80 \\ \overline{96}\quad\ \ \overline{288} \end{array} \qquad \text{As } 96 : 288 :: 1 : 3$$

*Anſ.* 3*s.*

2. A Vintner mingles 15 Gallons of Canary, at 8*s.* *per* Gallon, with 20 Gallons, at 7*s.* 4*d.* *per* Gallon, 10 Gallons of Sherry, at 6*s.* 8*d.* *per* Gallon, and 24 Gallons of White Wine, at 4*s.* *per* Gallon, what is the Worth of a Gallon of this Mixture? *Anſ.* 6*s.* 2*d.* ½ $\frac{46}{69}$.

3. A Grocer mingled 4 *cwt.* of Sugar, at 56*s.* *per cwt.* 7 *cwt.* at 43*s.* *per cwt.* and 5 *cwt.* at 37*s.* *per cwt.* I demand the Price of 2 *cwt.* of this Mixture? *Anſ.* £4..8..9.

4. A Malſter mingles 30 Quarters of brown Malt, at 28*s.* *per* Quarter, with 46 Quarters of pale, at 30*s.* a Quarter, and 24 Quarters of high dried *ditto*, at 25*s.* a Quarter, what is the Value of 8 Buſhels of this Mixture ?

*Anſ.* £1..8..2 $\frac{1}{4}$ $\frac{6}{16}$

5. If I mix 27 Buſhels of Wheat, at 5*s.* 6*d.* the Buſhel, with the ſame Quantity of Rye, at 4*s.* *per* Buſhel, and 14 Buſhels of Barley, at 2*s.* 8*d.* *per* Buſhel, what is the Worth of a Buſhel of this Mixture ? *Anſ.* 4*s* 3*d.* $\frac{3}{4}$ $\frac{28}{68}$.

6. A Grocer mingled 3 *cwt.* of Sugar, at 56*s.* *per cwt.* 6 *cwt.* at £1..17..4 *per cwt.* and 3 *cwt.* at £3..14..8 *per cwt.* what is 1 *cwt.* of this Mixture worth ?

*Anſ.* £2..11..4.

7. A Mealman has Flour of ſeveral Sorts, and would mix 3 Buſhels at 3*s.* 5*d.* *per* Buſhel, 4 Buſhels at 5*s.* 6*d.* *per* Buſhel, and 5 Buſhels at 4*s.* 8*d.* *per* Buſhel, what is the Worth of a Buſhel of this Mixture ? *Anſ.* 4*s.* 7*d.* $\frac{1}{2}$ $\frac{4}{12}$

8. A Vintner mixes 20 Gallons of Port, at 5*s.* 4 *d.* *per* Gallon, with 12 Gallons of White Wine, at 5*s.* *per* Gallon. 30 Gallons of Liſbon, at 6*s.* *per* Gallon, and 20 Gallons of Mountain, at 4*s.* 6*d.* *per* Gallon, what is a Gallon of this Mixture worth ? *Anſ.* 5*s.* 3*d.* $\frac{3}{4}$ $\frac{50}{82}$.

9. A Farmer mingled 20 Buſhels of Wheat, at 5*s.* *per* Buſhel, and 36 Buſhels of Rye, at 3*s.* *per* Buſhel, with 40 Buſhels of Barley, at 2*s.* *per* Buſhel, I deſire to know the Worth of a Buſhel of this Mixture ? *Anſ*, 3*s.*

10. A Perſon mixing a Quantity of Oats, at 2*s.* 6*d.* *per* Buſhel, with the like Quantity of Beans, at 4*s.* 6*d.* *per* Buſhel, would be glad to know the Price of one Buſhel of that Mixture ? *Anſ.* 3*s.* 6*d.*

11. A Refiner having 12*lb.* of Silver Bullion, of 6*oz.* fine, would melt it with 8*lb.* of 7*oz.* fine, and 10*lb.* of 8*oz* fine, required the Fineneſs of 1*lb.* of that Mixture ?

*Anſ*, 6*oz.* 18*d* 16 *gr.*

12. If with 40 Buſhels of Corn at 4*s.* *per* Buſhel, there are mixed 10 Buſhels, at 6*s.* *per* Buſhel, 30 Buſhels, at 5*s* *per* Buſhel, and 20 Buſhels, at 3*s.* *per* Buſhel, what will 10 Buſhels of that Mixture be worth ? *Anſ.* £2..3..–

12. A Tobacconiſt would mix 50*lb.* of Tobacco, at 11*d.* *per lb.* with 30*lb.* at 14*d.* *per lb.* 25*lb.* at 22*d.* *per lb.* and 37*lb.* at 2*s.* *per lb.* what will 1*lb.* of this Mixture be worth ?

*Anſ.* 16*d.* $\frac{3}{4}$ +

# ALLIGATION Alternate.

IS when the *Price* of ſeveral Things are given, to find ſuch *Quantities* of them to make a *Mixture,* that may bear a *Price* propounded.

*In ordering the Rates and given Prices,* obſerve,

1. Place them one under the other, and the propounded *Price* or *mean Rate,* on the Left-hand of them, *thus*

| | | |
|---|---|---|
| | 18 | 2 |
| 22 | 20 | 6 |
| | 24 | 4 |
| | 28 | 2 |

*Link* the ſeveral *Rates* together by 2 and 2, always obſerving to join a *greater* and a *leſs* than the mean.

3. Againſt each *Extream* place the *Difference* of the *mean* and its *Yoke Fellow.*

*When the Prices of the ſeveral Simples and the mean Rate are given without any Quantity, to find how much of each Simple is required to compoſe the Mixture.*

Rule. Take the *Difference* between each *Price* and the *mean Rate,* and ſet them *alternately,* they will be the Anſwer required.

Proof. By Alligation Medial.

### Examples.

1. A Vintner would mix four Sorts of Wines together, of 18*d.* 20*d* 24*d.* and 28*d. per* Quart, what Quantity of each muſt he take to ſell the Mixture at 22*d. per* Quart?

| | *Anſwer.* | | *Proof.* |
|---|---|---|---|
| | 18 | 2 of 18*d.* = | 36*d* |
| 22 | 20 | 6 of 20*d.* = | 120 |
| | 24 | 4 of 24*d* = | 96 |
| | 28 | 2 of 28*d.* = | 56 |
| | | 14 | )308 |
| | | | 22*d* |

| | *Or thus.* | | |
|---|---|---|---|
| | 18 | 6 of 18*d.* = | 108*d.* |
| 22 | 20 | 2 of 20*d.* = | 40 |
| | 24 | 2 of 24*d* = | 48 |
| | 28 | 4 of 28*d.* = | 112 |
| | | 14 | )308 |
| | | | 22*d.* |

Note, *Queſtions in this Rule do admit of a great Variety of* Anſwers, *according to the Manner of linking them.*

2. A Grocer would mix Sugar, at 4*d*. 6*d*. and 10*d*. *per lb*. ſo as to ſell the Compound at 8*d*. *per lb*. what Quantity of each muſt he take?

*Anſ. 2lb. at 4d. 2lb. at 6d. and 6lb. at 10d.*

3. I deſire to know how much Tea, at 16*s*. 14*s*. 9*s*. and 8*s*. *per lb*. will compoſe a Mixture worth 10*s*. *per lb*?

*Anſ. 1lb. at 16s. 2lb. at 14s. 6lb. at 9s. and 4lb at 8s.*

4. A Farmer would mix as much Barley at 3*s*. 6*d*. *per* Buſhel, Rye at 4*s*. *per* Buſhel, and Oats at 2*s*. *per* Buſhel, as to make a Mixture worth 2*s*. 6*d* *per* Buſhel; how much is that of each Sort? *Anſ* 6 *of Barley*, 6 *of Rye, and* 30 *of Oats*.

5. A Grocer would mix Raiſins of the Sun at 7*d*. *per lb*. with *Malagas* at 6*d*. and *Smyrna*'s at 4*d*. *per lb*. I deſire to know what Quantity of each Sort he muſt take to ſell them at 5*d*, *per lb*? *Anſ. 1lb, of Raiſins of the Sun, 1lb, of Malaga, and 3lb of Smyrna*'s.

6. A Tobacconiſt wonld mix Tobacco of 2*s*, 1*s*, 6*d*, and 1*s*, 3*d*, *per lb*, ſo as the Compound may bear a Price of 1*s*, 8*d*, *per lb*, what Quantity of each Sort muſt he take?

*Anſ. 7lb, at 2s, 4lb, at 1s, 6d, and 4lb, at 1s, 3d.*

## ALTERNATION. PARTIAL.

IS when the *Prices* of all the *Simples*, the *Quantity* of but one of them, and the *mean Rate* are given, to find the ſeveral *Quantities* of the Reſt in Proportion to that given.

RULE 1. Take the *Difference* between each *Price*, and the *mean Rate* as before. *Then*,

As the *Difference* of that *Simple*, whoſe *Quantity* is given : is to the reſt of the *Differences ſeverally* :: ſo is the *Quantity* given : to the ſeveral *Quantities* required.

### EXAMPLES.

1. A Tobacconiſt being determined to mix 20*lb*, of Tobacco, at 15*d*, *per lb*, with others at 16*d*, *per lb*, 18*d*, *per lb*, and 22*d*, *per lb*, how many Pounds of each Sort muſt he take to make one Pound of that Mixture worth 17*d*.

| | | | *Anſ.* | *Proof.* | |
|---|---|---|---|---|---|
| 17 | 15 | 5 | 20 *lb*. at 15*d*. | =300*d*. | As 5 : 1 :: 20 : 4 |
| | 16 | 1 | 4 *lb*. at 16*d*. | = 64 | As 5 : 1 :: 20 : 4 |
| | 18 | 1 | 4 *lb*. at 18*d*. | = 72 | As 5 : 2 :: 20 : 8 |
| | 22 | 2 | 8 *lb*. at 22*d*. | =176 | |
| | | | *Anſ.* 36*lb*, : | 612*d*, :: 1*lb*. : 17*d*. | |

2. A Farmer would mix 20 Buſhels of Wheat, at 60*d*, the Buſhel, with Rye, at 36*d*, Barley, at 24*d*, and Oats at 18*d per* Buſhel; how much muſt he take of each Sort to make the Compoſition worth 32*d*, *per* Buſhel? *Anſ.* 20 *Buſhels of Wheat*, 35 *Buſhels of Rye*, 70 *Buſhels of Barley*, *and* 10 *Buſhels of Oats.*

3. A Perſon is deſirous of mixing Wheat, at 4*s*, *per* Buſhel, Rye, at 3*s*, *per* Buſhel, Barley, at 2*s*, *per* Buſhel, with 12 Buſhels of Oats, at 18*d*, *per* Buſhel, I would be glad to know how many Buſhels of each Sort he muſt take to make the Compoſition worth 3*s*, 6*d*, *per* Buſhel. *Anſ.* 96 *Buſhels of Wheat*, 12 *Buſhels of Rye*, 12 *of Barley*, *and* 12 *of Oats.*

4. A Diſtiller would mix 40 Gallons oi *French* Brandy, at 12*s*, *per* Gallon, with *Engliſh* at 7*s*, and Spirits, at 4*s*, *per* Gallon, what Quantity of each Sort muſt he take to afford it for 8*s*, *per* Gallon? *Anſ.* 40 *Gallons* French, 32 Engliſh, *and* 32 *Spirits.*

5. A Grocer would mix Teas of 12*s*, 10*s*, and 6*s*, with 20*lb*, at 4*s*, *per lb.* how much of each Sort muſt he take to make the Compoſition worth 8*s*, *per lb*? *Anſ.* 20*lb*, *at* 4*s*, 10*lb*, *at* 6*s*, 10*lb*, *at* 10*s*, *and* 20*lb*, *at* 12*s*,

A Wine Merchant is deſirous of mixing 18 Gallons of Canary, at 6*s*, 9*d*, *per* Gallon, with *Malaga*, at 7*s*, 6*d*, *per* Gallon, Sherry, at 5*s*, *per* Gallon, and White Wine at 4*s*, 3*d*, *per* Gallon, how much of each Sort muſt he take, that the Mixture may be ſold for 6*s*, the Gallon? *Anſ.* 18 *Gallons of* Canary, 31 ½ *of* Malaga, 13 ½ *of Sherry*, *and* 27 *of White Wine.*

## ALTERNATION TOTAL.

IS when the *Price* of each *Simple*, the *Quantity* to be compounded, and the *mean Rate* are given, to find how much of *each* Sort will make that *Quantity*.

RULE 1. Take the *Difference* between each *Price* and the *mean Rate* as before, then

As the *Sum* of the *Differences* : is to each particular *Difference* :: ſo is the *Quantity* given : to the *Quantity* required,

## EXAMPLES.

1. A Grocer has four Sorts of Sugar, *viz.* 12*d*, 10*d*, 6*d*, and 4*d*, *per lb*, and would make a Compoſition of 144*lb* worth 8*d*, *per lb*, I deſire to know what Quantity of each he muſt take?

| | | *Anſwer.* | | | *Proof.* | |
|---|---|---|---|---|---|---|
| | 12 | 4 - - | 48 | at 12*d.* | 576 | As 12 : 4 : : 144 : 48 |
| 8 | 10 | 2 - - | 24 | at 10*d.* | 240 | As 12 : 2 : : 144 : 24 |
| | 6 | 2 - - | 24 | at 6*d.* | 144 | |
| | 5 | 4 - - | 48 | at 4*d.* | 192 | |
| | | 12 | 144 | | )1152(8*d.* | |

2. A Druggiſt having four Sorts of Tea, of 5*s.* 6*s.* 8*s.* and 9*s. per lb.* would have a Compoſition of 87 *lb.*. worth 7*s. per lb.* what quantity muſt there be of each? *Anſ.* 14 ½*lb of* 5*s.* 29*lb of* 6*s.* 29 *lb. of* 8*s. and* 14 ½ *lb. of* 9*s.*

3. A Vintner hath four Sorts of Wine, *viz.* White Wine, at 4*s. per* Gallon, *Flemiſh*, at 6*s. per* Gallon, *Malaga* at 8*s per* Gallon, and Canary, at 10*s. per* Gallon, would make a Mixture of 60 Gallons to be worth 5*s. per* Gallon, what Quantity of each muſt he take? *Anſ.* 45 *Gallons of White Wine,* 5 *Gallons of* Flemiſh, 5 *Gallons of* Malaga, *and* 5 *Gallons of* Canary.

4. A Grocer having four Sorts of Currants, of 11*d*, 9*d*, 6*d*, and 4*d*, the *lb*, is deſirous of making a Compoſition of 240 *lb*, worth 8*d*, the *lb* how much of each muſt he take?

*Anſ.* 96 *lb, at* 11*d*, 48 *lb, at* 9*d*, 24 *lb, at* 6*d*, *and* 72 *lb, at* 4*d.*

5. A Silverſmith hath 4 Sorts of Gold, *viz.* of 24 Carats fine, of 22, 20 and 15 Carats fine, would mix as much of each ſort together, ſo as to have 42 *oz.* of 17 Carats fine, how much muſt he take of each? *Anſ.* 4 *of* 24 *Carats fine,* 4 *of* 22, 4 *of* 20, *and* 30 *of* 15 *Carats fine.*

6. A Druggiſt having ſome Drugs of 8*s*, 5*s*, and 4*s*, *per lb*, made them into two Parcels, one of 28*lb*, at 6*s*, *per lb.* the other of 42*lb*, at 7*s*, *per lb.* how much of every Sort did he take for each Parcel?

| | |
|---|---|
| *Anſ.* 12 *lb. of* 8*s.* | *Anſ.* 30 *lb. of* 8*s.* |
| 8 *lb. of* 5*s.* | 6 *lb. of* 5*s.* |
| 8 *lb. of* 4*s.* | 6 *lb. of* 4*s.* |
| 28*lb. at* 6*s. per lb.* | 42*lb. at* 7*s. per lb.* |

# POSITION *or the* RULE *of* FALSE.

IS a Rule, that by *falſe* or *ſuppoſed* Numbers, taken at Pleaſure we diſcover the *true* ones required.

**POSITION** is divided into two Parts, SINGLE and DOUBLE.

## SINGLE POSITION.

Is by uſing *one ſuppoſed* Number, and working with it as the *true* one, you find the *real* Number required by the following

**RULE.** As the *Total* of the *Errors* : is to the *true Total* : : ſo is the *ſuppoſed Number* : to the *true one* required.

**PROOF** Add the ſeveral Parts of the Sum together, and if it agrees with the Sum it is right.

### EXAMPLES.

1. A School-maſter being aſked how many Scholars he had, ſaid, if I had as many, Half as many, and one Quarter as many more, I ſhould have 88, how many had he? *Anſ.* 32.

| | | | |
|---|---|---|---|
| Suppoſe he had - | 40 | As 110 : 88 : : 40 | 32 |
| *as many* - - - - | 40 | 40 | 32 |
| *Half as many* - | 20 | —— | 16 |
| $\frac{1}{4}$ *as many* - - - | 10 | 11\|0)35\|20( | 8 |
| | —— | —— | —— |
| | 110 | 32 | 88 *Proof.* |

2. A Perſon having about him a certain Number of *Portugal* Pieces, ſaid, if the third, fourth and ſixth of them were added together, they would make 54, I deſire to know how many he had? *Anſ.* 72.

3. A Gentleman bought a Chaiſe, Horſe and Harneſs for £60 the Horſe came to twice the Price of the Harneſs, and the Chaiſe to twice the Price of the Horſe and Harneſs, what did he give for each? *Anſwer, Horſe* £13..6..8. *Harneſs* £6..13..4. *Chaiſe* £40.

4. *A*, *B* and *C*, being determined to buy a Quantity of Goods, which would coſt them £120. agreed amongſt themſelves that *B* ſhould have a third Part more than *A*, and *C* a fourth Part more than *B*. I deſire to know what each Man muſt pay? *Anſ. A* £30. *B* £40. *C* £50.

5. A Man, overtaking a Maid driving a Flock of Geeſe, ſaid to her, how do you do Sweetheart? Where are you going with theſe 30 Geeſe? No, Sir, ſaid ſhe, I have not 30, but if I had as many more, half as many more, and 5 Geeſe beſides, I ſhould have 30; how many had ſhe? *Anſ.* 10.

6. A Perſon delivered to another a Sum of Money, unknown, to receive Intereſt for the ſame at 6 *per Cent per Annum*, ſimple Intereſt, and at the End of ten Years received for Principal and Intereſt £300. what was the Sum lent?

*Anſ* £187..10..–.

## DOUBLE POSITION.

Is by making Uſe of *two ſuppoſed* Numbers, and if both prove *falſe* (as it generally happens) are with their *Errors* to be thus ordered.

RULE 1. Place each *Error* againſt its reſpective *Poſition*.

2. Multiply them croſs-wiſe.

3. If the *Errors* are *alike*, *i. e.* both *greater*, or both *leſs* than the given Number, take their Difference for a *Diviſor*, and the *Differences* of their Products for a *Dividend*.

But if *unlike*, take their *Sum* for a *Diviſor*, and the *Sum* of their *Products* for a *Dividend*, the *Quotient* will be the *Anſwer*.

### EXAMPLES.

1. *A*, *B* and *C* would divide £200 between them, ſo as that *B* may have £6 more than *A*, and *C* £8 more than *B*, how much muſt each have?

*Suppoſe* A *had* 40
*then* B *had* 46
*and* C - - - 54

140 *too little by* 60

*Then ſuppoſe* A *had* 50
*then* B *muſt have* 56
*and* C - - - - - 64

170 *too little by* 30

*Sup.* *Errors.*
40 ╳ 60
50 ╳ 30

3000 1200
1200

3|0)180|0
60 *Anſ. for* A.

60
30
—
30 *Diviſor.*

60 A
66 B
74 C

200 *Proof.*

2. A Man had two Silver Cups, of unequal Weight, having one Cover to both, of 5 *oz.* now if the Cover is put on the leſſer Cup, it will be double the Weight of the greater Cup, and ſet on the greater Cup, it will be thrice as heavy as the leſſer Cup, what is the Weight of each Cup?

*Anſ.* 3 *Ounces leſſer*, 4 *greater.*

3. *A*, *B* and *C* playing at Hazard together, the Money ſtaked was 196 Guineas, but diſagreeing, each ſeized as many as he could, *A* got a certain Quantity, *B* as many as *A* and 16 more, and *C* the 6th Part of both their Sums, how many had each? *Anſ.* A 76, B 92, *and* C 28.

4. A Gentleman bought a Houſe with a Garden, and a Horſe in the Stable for £500 now he paid 4 Times the Price of the Horſe for the Garden, and five Times the Price of the Garden for the Houſe, what was the Value of the Houſe, Garden and Horſe ſeparately?

*Anſ. Horſe* £20. *Garden* £80. *Houſe* £400.

5. Three Perſons diſcourſed concerning their Ages; ſays *H* I am 30 Years of Age, ſays *K* I am as old as *H* and ¼ of *L*, and ſays *L* I am as old as you both, what was the Age of each Perſon? *Anſ.* H 30, K 50, *and* L 80.

6. *D*, *E* and *F* playing at Cards, ſtaked 324 Crowns, but diſputing about the Tricks, each took as many as he could, *D* got a certain Number, *E* as many as *D* and 15 more, and *F* got a 5th Part of both their Sums added together, how many did each get? *Anſ.* D 127½ E 142½ *and* F 54.

7. *A* ſtealing Apples, was taken by *B*, and to appeaſe him gave him Half he had, and *B* gives him back 10, going further, he meets *C*, who took from him half of what he had left, and gives him back 4. After that, meeting with *D* he gives him half of what he had, and he returns him back one; at laſt, getting ſafe away, he finds he had 13 left, how many had he at firſt? *Anſ.* 60.

8. A Gentleman coming into a Garden, meets with ſome Ladies, ſays to them. Good Morning to you 10 fair Maids! Sir, you miſtake (anſwered one of them) we are not 10, but if we were twice as many more as we are, we ſhould be as many above 10 as we are now under, how many were they?

*Anſ.* 5.

# EXCHANGE.

IS the receiving of Money in one Country for the ſame Value paid in another.

The *Par* of Exchange is always fixed and certain, it being the intriſic Value of Foreign Money compared with *Sterling*, but the *Courſe* of Exchange riſes and falls upon various Occaſions.

## I. FRANCE.

They keep their *Accounts* at *Paris*, *Lyons*, and *Rouen*, in *Livres*, *Sols* and *Deniers*, and Exchange by the *Crown*, =4s. 6d. at *Par*.

NOTE. 12 *Deniers make* 1 *Sol.*
20 *Sols* - - - - - - 1 *Livre.*
3 *Livres.* - - - 1 *Crown.*

*To change* French *into* Sterling.

RULE. As 1 Crown: is to the given Rate : : ſo is the *French* Sum to the *Sterling* required.

*To change* Sterling *into* French.

RULE. As the Rate of Exchange: is to 1 Crown : : ſo is the *Sterling* Sum: to the *French* required.

### EXAMPLES.

1. How many Crowns muſt be paid at *Paris*, to receive in *London* £180. Exchange at 4s. 6d. *per* Crown?

```
    d.  cr.    £
As 54 : 1 : : 180
              240 Crowns.
           ------
      54)43200(800
         432
         ---
          ..00
          ---
```

2. A Merchant at *Paris* remits to his Correſpondent in *London* 800 Crowns, at 4s. 6d. each, what is the Value in *Sterling*?

```
cr.
1 : 54 : : 800
            54
         -----
      12)43200
         -----
      2|0)360|0
         -----
          £180
```

3. How much Sterling muſt be paid in *London* to receive in *Paris* 758 Crowns Exchange, at 56*d. per* Crown?
*Anſ.* £176..17..4.

4. A Merchant in *London* remits £176..17..4 to his Correſpondent at *Paris*, what is the Value in *French* Crowns, at 56*d.* *per* Crown ? *Anſ.* 758

5. Change 725 Crowns, 17 Sols, 8 Deniers, at 54*d* ½ *per* Crown, into Sterling, what is the Sum ? *Anſ.* 164..14..– ½

6. Change £164..14..– ½ Sterling, into *French* Crowns, Exchange, at 54*d* ½ *per* Crown ?

*Anſ.* 725 *Crowns*, 17 *Sols*, 7 *Deniers.*

## II SPAIN.

They keep their Accounts at *Madrid*, *Cadiz*, and *Seville*, in *Dollars*, *Rials* and *Maravedies*, and Exchange by the *Piece of Eight*=4*s*. 6*d*. at *Par*.

NOTE. 34 *Maravedies make* 1 *Rial.*
8 *Rials* - - - - - - - - 1 *Piaſtre, or Piece of Eight.*
10 *Rials* - - - - - - - - 1 *Dollar.*

RULE. As with *France*.

### EXAMPLES.

7. A Merchant at *Cadiz* remits to *London*, 2547 Pieces of Eight, at 56*d*. *per* Piece how much Sterling is the Sum?

*Anſ* £594..6..–.

8. How many Pieces of Eight, at 56*d*. each, will anſwer a Bill of £594..6..–. Sterling? *Anſ.* 2547.

9. If I pay a Bill here of £2500 what *Spaniſh* Money may I draw my Bill for at *Madrid*, Exchange at 57*d* ½ *per* Piece of Eight ? *Anſ.* 10434 *Pieces of Eight*, 6 *Rials*, 8 *Mar.*

## III. ITALY.

They keep their Accounts at *Genoa* and *Leghorn* in *Livres*, *Sols*, and *Deniers*, and Exchange by the *Piece of Eight*, or *Dollar*=4*s*. 6*d*. at *Par*.

NOTE, 12 *Deniers make* 1 *Sol.*
20 *Sols* - - - - 1 *Livre.*
5 *Livres* - - - 1 *Piece of Eight at* Genoa.
6 *Livres* - - - - 1 *Piece of Eight at* Leghorn.

*N. B.* The Exchange at *Florence*, is by *Ducatoons*, the Exchange at *Venice* by *Ducats*.

NOTE. 6 *Solidi make* 1 *Groſs.*
24 *Groſſes* - - 1 *Ducat.*

RULE. The ſame as before.

EXAM-

### EXAMPLES.

10. How much *Sterling* Money may a Perſon receive in *ndon*, if he pays in *Genoa* 976 Dollars, at 53*d*. *per* Dollar?
*Anſ*. £215..10..8.

11. A Merchant remitted £215..10..8. *Sterling* to *Leg-orn*, how many Dollars will he receive there, the Exchange eing at 53*d*. *per* Dollar? *Anſ*. 976.

12. A Factor hath ſold Goods at *Florence*, for 250 Duca-oons, at 54*d*. each, what is the Value in Pounds *Sterling*?
*Anſ*. £56..5..–.

13. A Bill of £56..5..–. is remitted to *Florence*, to be paid n Ducatoons, at 54*d*. each, how many will be received?
*Anſ*. 250.

14. If 275 Ducats, at 4*s*. 5*d*. each, be remitted from *Venice* to *London*, what is the Value in Pounds *Sterling*?
*Anſ*. £60..14..7.

15. A Gentleman travelling, would Exchange £60..14..7. *Sterling*, for *Venice* Ducats, at 4*s*. 5*d*. each, how many muſt he receive? *Anſ*. 275.

## IV. PORTUGAL.

They keep their Accounts in *Oporto* and *Liſbon*, in *Reas* and Exchange on the *Milrea*=6*s*. 8*d* $\frac{1}{2}$ at *Par*.

NOTE. 1000 *Reas make* 1 *Milrea*.

RULE. The ſame with *France*.

### EXAMPLES.

16. A Gentleman being deſirous to remit to his Correſpondent in *London* 2750 Milreas, Exchange at 6*s*. 5*d*. *per* Milrea, how much *Sterling* will he be Creditor for in *London*?
*Anſ*. £882..5..10.

17. If a Bill be drawn from *London* of £882..5..10. *Sterling*, how many Milreas, at 6*s*. 5*d*. each, is equal in Value to the ſaid Sum? *Anſ*. 2750.

18. A Merchant at *Oporto* remits to *London*, 4366 Milreas and 183 Reas, at 5*s*. 5*d*. $\frac{5}{8}$ Exchange, *per* Milrea, how much *Sterling* muſt be paid in *London*, for this Remittance?
*Anſ*. £1193..17..6. $\frac{3}{4}$

19. If I pay a Bill at *London*, of £1193..17..6. $\frac{3}{4}$ what muſt I draw for on my Correſpondent at *Liſbon*, Exchange at 5*s*. 5*d*. $\frac{5}{8}$ *per* Milrea? *Anſ*. 4366 *Milreas*, 183 *Reas*.

## V. HOLLAND, FLANDERS, *and* GERMANY.

They keep their Accounts at *Antwerp*, *Amſterdam*, *Bruſſels*, *Rotterdam*, and *Hamburgh*: Some in *Pounds*, *Shillings*, and *Pence*, as in *England*; other in *Guilders*, *Stivers*, and *Pennengs*, and Exchange with us on our *Pound* at 33*s.* 4*d.* *Flemiſh*, at *Par*.

NOTE. 8 *Pennings - make - -* 1 *Groat.*
2 *Groats or* 16 *Pennings* 1 *Stiver.*
20 *Stivers - - - - - - - -* 1 *Guilder or Florin.*

ALSO,

12 *Groats or* 6 *Stivers make* 1 *Schelling.*
20 *Schelling or* 6 *Guilders -* 1 *Pound.*

### *To change* Flemiſh *into* Sterling.

RULE. As the given Rate : is to 1 Pound : : ſo is the *Flemiſh* Sum : to the *Sterling* required.

### *To change* Sterling *into* Flemiſh.

RULE. As £1 *Sterling* : is to the given Rate : : ſo is the *Sterling* given : to the *Flemiſh* ſought.

### EXAMPLES.

20. Remitted from *London* to *Amſterdam*, a Bill of £754..10..–. *Sterling*, how many Pounds *Flemiſh* is the Sum, the Exchange at 33*s.* 6*d.* *Flemiſh per* Pound Sterling?
*Anſ.* £1263..15..9. Flemiſh.

21. A Merchant at *Rotterdam* remits £1263..15..9. *Flemiſh* to be paid in *London*, how much *Sterling* Money muſt he draw for, the Exchange being at 33*s.* 6*d.* *Flemiſh per* Pound *Sterling* *Anſ.* £754..10..–.

22. If I pay in *London* £852..12..6. *Sterling*, how many Guilders muſt I draw for at *Amſterdam*, Exchange at 34 *Schel.* 4½ *Groats Flemiſh per* Pound *Sterling*?
*Anſ.* 8792..*Guild.* 13 *Stiv.* 14½ *Pennings.*

22. What muſt I draw for at *London*, if i pay at *Amſterdam* 8792 *Guild.* 13 *Stiv.* 14½ *Pennings*, Exchange at 34 *Schel.* 4½ *Groats*, *per* Pound *Sterling*? *Anſ.* £852..12..6.

### To convert *Bank* Money into Current and the contrary.

**NOTE,** *The* Bank *Money is worth more than the* Current. *The Difference between the one and the other is called* Agio, *and is generally from* 3 *to* 6 per Cent. *in Favour of the* Bank.

### *To change* Bank *into* Current *Money.*

**RULE.** As 100 Guiders *Bank* : is to 100 with the *Agio* added : : ſo is the *Bank* given : to the *Current* required.

### *To change* Current *Money into* Bank.

**RULE.** As 100, with the *Agio* added, : is to 100 *Bank* : : ſo is the *Current* Money given : to the *Bank* required.

24. Change 794 Guilders, 15 Stivers, Current Money into Bank Florins, Agio 4 $\frac{3}{8}$ *per Cent?*
*Anſ.* 761 *Guilders* 8 *Stivers*, 11 *Pennings.*
25. Change 761 Guilders, 9 Stivers Bank into Current Money, Agio 4 $\frac{3}{8}$ *per Cent? Anſ.* 794 *Guild.* 15 *Stiv.* 4 *Penn.*

## VI. IRELAND.

26. A Gentleman remits to *Ireland* £575. 15..–. *Sterling*, what will he receive there, the Exchange being at 10 *per Cent.? Anſ.* £633..6..6.
27. What muſt be paid in *London* for a Remittance of £633..6..6. *Iriſh*, Exchange at 10 *per Cent? Anſ.* £575..15..–

## COMPARISON *of* WEIGHTS *and* MEASURES.

### EXAMPLES.

1. If 50 *Dutch* Pence be worth 65 *French* Pence, how many *Dutch* Pence are equal to 350 *French* Pence? *Anſ.* 269 $\frac{15}{65}$.
2. If 12 Yards at *London* make 8 *Ells* at *Paris*, how many Ells at *Paris* will make 64 Yards at *London*? *Anſ.* 42 $\frac{8}{12}$.

3. If 30*lb.* at *London* make 28*lb.* at *Amſterdam.* how many *lb.* at *London* will be equal to 350*lb* at *Amſterdam?* *Anſ.* 375.

4. If 95*lb* *Flemiſh* make 100*lb.* *Engliſh*, how many *lb.* *Engliſh* are equal to 275*lb.* *Flemiſh?* *Anſ.* $289\frac{5}{95}$.

# CONJOIND PROPORTION.

IS when the *Coin*, *Weight*, or *Meaſures* of ſeveral Countries are compared in the ſame Queſtion, or it is linking together a Variety of Proportions.

When it is required to find how many of the firſt Sort of *Coin*, *Weight* or *Meaſure* mentioned in the Queſtion, are equal to a given *Quantity* of the *laſt*.

RULE. Place the Numbers alternately, beginning at the **Left-hand and let the laſt Number ſtand on the Left-hand; then multiply the firſt Row continually** ***for a Dividend,*** **and the ſecond for a** ***Diviſor.***

PROOF. By as many ſingle Rules of Three as the Queſtion requires.

## EXAMPLES.

1. If 20*lb.* at *London* make 23*lb.* at *Antwerp*, and 155*lb.* at *Antwerp.* make 180*lb.* at *Legborn*, how many *lb.* at *London* are equal to 72*lb.* at *Legborn?*

| *Left.* | *Right.* | |
|---|---|---|
| 20 | 23 | $20\times155\times72=223200$ |
| 155 | 180 | $23\times180=4140)223200(53\frac{378}{414}$ |
| 72 | | |

2. If 12*lb.* at *London* make 10*lb.* at *Amſterdam*, 100*lb.* at *Amſterdam*, 120*lb.* at *Thoulouſe*, how many Pounds at *London* are equal to 40*lb.* at *Thoulouſe?* *Anſ.* 40*lb.*

3. If 140 Braces at *Venice* are equal to 156 Braces at *Legborn*, and 7 Braces at *Legborn* equal to 4 Ells *Engliſh*, how many Braces at *Venice* are equal to 16 Ells *Engliſh?*
*Anſ.* $25\frac{80}{624}$.

4. If 40*lb.* at *London* make 36*lb.* at *Amſterdam*, and 90*lb.* at *Amſterdam* make 116*lb.* at *Dantzick*, how many *lb.* at *London* are equal to 130*lb.* at *Dantzick?* *Anſ.* $112\frac{288}{4176}$.

When it is required to find how many of the *laſt* Sort of *Coin*, *Weight* or *Meaſure* mentioned in the Queſtion, is equal to a *Quantity* of the *firſt*.

RULE. Place the Numbers alternately, beginning at the Left-hand, and let the laſt Number ſtand on the Right-hand; then multiply the firſt Row for a *Diviſor*, and the ſecond for a *Dividend*.

### EXAMPLES.

5. If 12*lb.* at *London* make 10*lb.* at *Amſterdam*, 100*lb.* at *Amſterdam* 120 at *Thoulouſe*, how many *lb.* at *Thoulouſe* are equal to 40*lb.* at *London?* *Anſ.* 40*lb.*

6. If 40*lb.* at *London* make 36*lb.* at *Amſterdam*, and 90*lb.* at *Amſterdam*, 116 at *Dantzick*, how many *lb.* at *Dantzick* are equal to 122 at *London?* *Anſ.* 141 $\frac{1872}{3600}$.

# PROGRESSION,

Oonſiſts in two PARTS:

## ARITHMETICAL *and* GEOMETRICAL;

## ARITHMETICAL PROGRESSION.

IS when a Rank of Numbers increaſe or decreaſe regularly, by the continual *adding* or *ſubtracting* of the equal Numbers: As 1, 2, 3, 4, 5, 6, are in Arithmetical Progreſſion by the continual *increaſing* or *adding* of one, 11, 9, 7, 5, 3, 1, by the continual *increaſing* or *Subtracting* of two.

NOTE. *When any even Number of Terms differ by Arithmetical Progreſſion, the Sum of the two* Extreams *will be equal to the two* middle *Numbers, or any two* Means *equally diſtant from the* Extreams: *As* 2, 4, 6, 8, 10, 12, *where* $6+8$, *the two middle Numbers, are* $= 124 + 2$, *the two Extreams, and* $=10 +4$ *the two Means*$=14$.

*When the Number of Terms are odd, the Double of the* middle Term *will be equal to the* two Extreams, *or of any* two Means *equally diſtant from the* Middle Term: *As* 1, 2, 3, 4, 5, *where the Double of* $3=5+1=2+4=6$.

In *Arithmetical Progreſſion* five Things are to be obſerved, *viz.*

1. The firſt Term.
2. The laſt Term.
3. The Number of Terms.
4. The equal Difference.
5. The Sum of all the Terms.

*Any three of which being given, the other two may be found.*

The *firſt*, *ſecond* and *third* Term given to find the *fifth*,

RULE. Multiply the *Sum* of the *two Extreams* by Half the *Number* of Terms, or multiply *Half* the Sum of the *two Extreams* by the *whole Number* of Terms, the Product is the *Total* of all the Terms.

## EXAMPLES.

1. How many Strokes does the Hammer of a Clock ſtrike in 12 Hours? *Anſ.* 78.

$12+1=13$ *then* $13\times6=78$.

2. A Man buys 17 Yards of Cloth, and gave for the firſt Yard 2*s.* and for the laſt 10*s.* what did the 17 Yards amount to? *Anſ.* £5..2,.–.

3. If 100 Eggs were placed in a right Line, exactly a Yard aſunder from one another, and the firſt a Yard from a Baſket, what Length of Ground does that Man go who gathers up theſe 100 Eggs ſingly, returning with every Egg to the Baſket to put it in? *Anſ.* 5 *Miles* 1300 *Yards.*

The *firſt*, *ſecond* and *third Terms* given, to find the *fourth*.

RULE. From the *ſecond* ſubtract the *firſt*, the Remainder *divided* by the *third* leſs *one* gives the *fourth*.

## EXAMPLES.

4. A Man had 8 Sons, the youngeſt was 4 Years old, and the eldeſt 32, they increaſe in Arithmetical Progreſſion. what was the common Difference of their Ages? *Anſ.* 4.

$32-4=28$ *then* $28\div8-1=4$ *common Difference.*

5. A Man is to travel from *London* to a certain Place in 12 Days, and to go but 3 Miles the firſt Day, increaſing every Day by an equal Exceſs, ſo that the laſt Days Journey may be 58 Miles, what is the daily Increaſe, and how many Miles diſtant is that Place from *London* ? *Anſ.* 5 *daily Increaſe.*

*Therefore as* 3 *Miles is the firſt Day's Journey.*
$3+5=8$ *the ſecond Day.*
$8+5=13$ *the third Day,* &c.
*The whole Diſtance is* 366 *Miles.*

The *firſt*, *ſecond* and *fourth* Terms given to find the *third.*

RULE. From the *ſecond* ſubtract the firſt, the Remainder *divide* by the *fourth* and to the Quotient add 1, gives the *third.*

## EXAMPLES.

6. A Perſon travelling into the Country, went 3 Miles the firſt Day, and increaſed every Day by 5 Miles, till at laſt he went 58 Miles in one Day, how many Days did he travel ? *Anſ.* 12.

$58-3=55$ *then* $55\div5=11$ *and* $11+1=12$ *the Number of Days.*

7. A Man being aſked how many Sons he had, ſaid, that the Youngeſt was 4 Years old, and the Eldeſt 32, and that he increaſed one in his Family every four Years, how many had he ? *Anſ.* 8.

The *ſecond*, *third* and *fourth* given to find the *firſt.*

RULE. Multiply the *fourth* by the *third* made *leſs* by 1 the Product ſubtracted from the *ſecond* gives the *firſt.*

## EXAMPLES.

8. A Man in 10 Days went from *London* to a certain Town in the County, every Day's Journey increaſing the former by 4, and the laſt he went was 46 Miles, what was the firſt ? *Anſ.* 10 *Miles.*

---

$4+10-1=36$ *then* $46-36=10$, *the firſt Day's Journey.*

9. A Man takes out of his Pocket at 8 ſeveral Times, ſo many different Number of Shillings, every one exceeding the former by 6; the laſt 46, what was the firſt ? *Anſ.* 4.

The *ſecond, third* and *fifth* given, to find the *firſt.*

RULE. *Divide* the *fifth* by the *third,* and from the Quotient *ſubtract half* the Product of the *fourth* multiplied by the *third leſs* 1, gives the *firſt.*

### EXAMPLES.

10. A Man is to receive £360. at 12 ſeveral Payments, each to exceed the former by £4. and is willing to beſtow the firſt Payment on any one that can tell him what it is, what will that Perſon have for his Pains? *Anſ.* £8.

$$360 \div 12 = 30 \text{ then } 30 - \frac{4 \times \overline{12-1}}{2} = 8. \text{ the firſt Payment.}$$

The *fitſt, third* and *fourth* given to find the *ſecond.*

RULE. Subtract the *fourth* from the Product of the *third,* multiplied by the *fourth,* that Remainder added to the *firſt,* gives the *ſecond.*

### EXAMPLE.

11. What is the laſt Number of an Arithmetical Progreſſion, beginning at 6, and continuing by the Increaſe of 8 to 20 Places? *Anſ.* 158.

$$\overline{20 \times 8 - 8} = 152 \text{ then } 152 + 6 = 158, \text{ the laſt Number.}$$

## GEOMETRICAL PROGRESSION.

IS the increaſing or decreaſing of any Rank of Numbers by ſome common *Ratio,* that is by the continual *Multiplication,* or *Diviſion* of ſome equal Number: *As* 2, 4, 8, 16, *increaſe* by the Multiplier, 2, and 16, 8, 4, 2 *decreaſe* by the Diviſor 2.

NOTE. *When any Number of Terms is continued in Geometrical Progreſſion, the Product of the two* Extreams *will be equal to any* two Means, *equally diſtant from the* Extreams: As 2, 4, 8, 16, 32, 64, where 64×2 *are*=4×32, *and* 8×16=128.

*When the Nnmber of Terms, are* odd, *the* middle Term *multiplied into itſelf will be equal to the* two Extreams, *or any* two, Means, *equally diſtant from the* Mean*:* As 2, 4, 8, 16, 32, *where* $2\times32=4\times16=8\times8=64$.

In *Geometrical Progreſſion* the ſame five Things are to be obſerved, as in *Arithmetical*, *viz.*

1. The firſt Term.
1. The laſt Term.
3. The Number of Terms.
4. The equal Difference or Ratio.
5. The Sum of all the Terms.

NOTE. *As the laſt Term in a long Series of Numbers is very tedious to come at, by continual Multiplication; therefore, for the reader finding out, there is a Series of Numbers made uſe of in* Arithmetical Progreſſion, *called* Indices, *beginning with an* Unit, *whoſe common* Difference *is* one, *whatever Number of* Indices *you make uſe of, ſet as many Numbers (in ſuch* Geometrical Proportion *as is given in the Queſtion) under them:*

*As* 1, 2, 3, 4, 5, 6, *Indices.*
2, 4, 8, 16, 32, 64. *Numbers in Geometrical Proportion.*

*But if the* firſt Term in Geometrical Proportion *be* different *from the* Ratio, *the* Indices *muſt begin with a* Cypher.

*As* 0, 1, 2, 3, 4, 5, 6. *Indices.*
1, 2, 4, 8, 16, 32, 64. *Numbers in Geometrical Propoatio.*

*When the* Indices *begin with a* Cypher, *the Sum of the* Indices *made choice of muſt be always one* leſs *than the Number of Terms given in the Queſtion; for* 1 *in the* Indices *is over the ſecond Term, and two over the third,* &c.

*Aad any two if the* Indices *together, and that* Sum, *will agree with the Product of their reſpective Terms,*

*As in the firſt Table of* Indices $2+5=7$
Geometrical Proportion $4\times32=128$

*Then in the ſecond* $2+4=6$
$4\times16=64$

In any *Geometrical Progreſſion* proceeding from *Unity*, the *Ratio* being known, to find any remote Term, without producing all the *intermediate Terms*.

RULE. Find what Figures of the *Indices* added together would give the *Exponent* of the *Term wanted*, then multiply the Numbers ſtanding under ſuch *Exponent* into each other and it will give the *Term required*.

NOTE. *When the* Exponent 1 *ſtands over the* ſecond Term, *the Number of* Exponents *muſt be* 1 leſs *than the Number of* Terms.

## EXAMPLES.

1. A Man agrees for 12 Peaches, to pay only the Price of the laſt, reckoning a Farthing for the firſt, an Half penny for the ſecond, &c. doubling the Price to the laſt, what muſt he give for them? *Anſ.* £2..2..8.

0, 1, 2, 3, 4, *Exponents*

16=4
16=4

256=8
8=3

For 4+4+3=11, *N° of Terms leſs* 1.

4)2048=11 *N° of Far.*

12)512

2|0)4|2..8

£2..2..8

2. A Country Gentleman going to a Fair to buy ſome Oxen, meets with a Perſon who had 23, he demanding the Price of them, was anſwered £16. a Piece; the Gentleman bids him £15. a Piece, and he would buy all; the other tells him it would not be taken, but if he would give what the laſt Ox would come to, at a Farthing for the firſt, and doubling it to the laſt, he ſhould have all. What was the Price of the Oxen? *Anſ.* £4369..1..4.

In any *Geometrical Progreſſion*, not proceeded from *Unity*, the *Ratio* being given, to find any remote *Term*, without producing all the *intermediate Terms*.

RULE. Proceed as in the *laſt*, only obſerve that every *Product* muſt be divided by the *firſt Term*.

EXAM-

## EXAMPLES.

3. A Sum of Money is to be divided among 8 Perſons, the firſt to have £20. the ſecond £60. and ſo on in triple Proportion, what will the laſt have? *Anſ.* £43740.

0, 1, 2, 3,
20, 60, 180, 540,

$$\frac{540\times540}{20}=14580 \textit{ then } \frac{14580\times60}{20}=43740$$

$3+3+1=7$ *one leſs then the Number of Terms.*

4. A Gentleman dying left 9 Sons, to whom and to his Executors, bequeathed his Eſtate in Manner following: To his Executor £50. his youngeſt Son was to have as much more as the Executors, and each Son to exceed the next younger by as much more, what was the eldeſt Son's Portion? *Anſ.* £25600.

The *firſt Term, Ratio,* and *Number of Terms* given to find the *Sum* of all the *Terms,*

RULE. Find the *laſt Term* as before, then ſubſtract the *firſt* from it, and *divide* the Remainder by the *Ratio,* leſs, *one,* to the *Quotient* of which add the *greater,* gives the *Sum* required.

## EXAMPLES.

5. A Servant ſkilled in Numbers, agreed with a Gentleman to ſerve him 12 Months, provided he would give him a Farthing for his firſt Month's Service, a Penny for the ſecond, and 4*d.* for the third, &c. what did his Wages amount to? *Anſ.* £5825..8..5 ¼.

0, 1, 2, 3, 4,
1, 4, 16, 64, 256,

$$256\times256=65536 \textit{ then } 65536\times64=4194304$$

$$\frac{4194304-1}{4-1}=1398101. \textit{ then}$$

$4+4+3=11$ *N° of Terms leſs* 1.

$$1398101+4194304=5592405 \textit{ Farthings}$$

6. A Man bought a Horſe, and by Agreement was to give a Farthing for the firſt Nail, three for the ſecond, &c. there were 4 Shoes, and in each Shoe 8 Nails, what was the Worth of the Horſe? *Anſ.* £965114681693..13..4.

7. A certain Perſon married his Daughter on New-year's Day, and gave her Huſbaud 1*s.* towards her Portion, promiſing to double it, on the firſt Day of every Month for one Year, what was her Portion? *Anſ.* £204..15..–.

8. A Laceman well verſed in Numbers agreed with a Gentleman to ſell him 22 Yards of rich Gold brocaded Lace, for 2 Pins the firſt Yard, 6 Pins the ſecond, &c. in triple Proportion. I deſire to know what he ſold the Lace for, if the Pins were valued at 100 for a Farthing; alſo what the Laceman got or loſt by the Sale thereof, ſuppoſing the Lace ſtood him in £7 *per* Yard?

*Anſ. the Lace ſold for* £326886..0..9.
*Gain* £326732..–..9.

# PERMUTATION.

IS the changing or varying the order of Things.

RULE. Multiply all the given Terms, one into another, and the laſt Product will be the Number of Changes required.

## EXAMPLES.

1. How many Changes may be rung upon 12 Bells, and how long would they be ringing but once over, ſuppoſing 10 Changes might be rung in one Minute, and the Year to contain 365 Days, 6 Hours;

*Anſ.* 1×2×3×4×5×6×7×8×9×10×11×12 = 479001600 *Changes which* ÷ 10 = 47900160 *Minutes, and if reduced, is* = 91 *Years,* 3 *Weeks,* 5 *Days,* 6 *Hours.*

2. A young Scholar coming into Town for the Conveniency of a good Library, demands of a Gentleman with whom he lodged, what his Diet would coſt for a Year, who told him £10. but the Scholar not being certain what Time he ſhould ſtay, aſked him what he muſt give him for ſo long as he could place his Family (conſiſting of ſix Perſons beſides himſelf) in different Poſitions, every Day at Dinner; the Gentleman thinking it would not be long, tells him £5. to which the Scholar agrees. What Time did the Scholar ſtay with the Gentleman? *Anſ.* 5040 *Days.*

THE

# THE

# TUTOR's ASSISTANT.

## PART II.

## VULGAR FRACTIONS.

A FRACTION is a Part or Parts of an *Unit*, and written with two Figures, with a Line between them, as $\frac{1}{4}$, $\frac{2}{6}$, $\frac{1}{8}$, *&c.*

The Figure above the Line is called the *Numerator*, and the under one the *Denominator*, which ſhews how many Parts the Unit is divided into, and the *Numerator* ſhews how many of thoſe Parts are meant by the Fraction.

There are four Sorts of Vulgar Fractions, *Proper*, *Improper*, *Compound* and *Mixed*, viz.

1. A PROPER FRACTION is when the Numerator is *leſs* than the Denominator, as $\frac{2}{4}$, $\frac{3}{6}$, $\frac{7}{8}$, $\frac{9}{11}$, $\frac{101}{701}$, *&c.*

2. An IMPROPER FRACTION is when the Numerator is *equal* to, or *greater* than the Denominator, as $\frac{8}{3}$, $\frac{8}{4}$, $\frac{12}{12}$, $\frac{107}{2}$, *&c.*

3. A COMPOUND FRACTION is the Fraction of a Fraction, and known by the Word *of*, as $\frac{1}{2}$ *of* $\frac{2}{3}$, $\frac{7}{9}$ *of* $\frac{8}{17}$ *of* $\frac{9}{12}$, *&c.*

4. A MIXED NUMBER *or* FRACTION is compoſed of an whole Number and Fraction, as, 8 $\frac{2}{7}$, 17 $\frac{1}{2}$, 8 $\frac{71}{97}$, *&c.*

## REDUCTION *of* VULGAR FRACTIONS.

1. *TO reduce Fractions to a common Denominator.*

RULE. Multiply each Numerator into all the Denominators, except its own, for a new Numerator, and all the Denominators for a common Denominator. Or,

2. Multiply the common Denominator by the ſeveral given Numerators ſeparately, and divide the Product by their ſeveral Denominators, the Quotients will be the new Numerators.

### EXAMPLES.

1. Reduce $\frac{2}{4}$ and $\frac{4}{7}$ to a common Denominator.

*Facit* $\frac{14}{28}$, *and* $\frac{16}{28}$.

*firſt num.* *2d. num.*

$2\times7=14$ $4\times4=16$ *then* $4\times7=28$ *den.* $=\frac{14}{28}$ *and* $\frac{16}{28}$.

2. Reduce, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{5}{8}$ to a common Denominator.

*Facit* $\frac{32}{64}$, $\frac{48}{64}$, $\frac{40}{64}$.

3. Reduce, $\frac{7}{8}$, $\frac{4}{6}$ $\frac{9}{10}$, and $\frac{6}{7}$ to a common Denominator.

*Facit* $\frac{2940}{3360}$, $\frac{2240}{3360}$, $\frac{3024}{3360}$, $\frac{1280}{3360}$.

4. Reduce, $\frac{6}{10}$, $\frac{2}{4}$, $\frac{1}{7}$ and $\frac{3}{6}$ to a common Denominator.

*Facit* $\frac{1008}{1680}$, $\frac{840}{1680}$, $\frac{240}{1680}$, $\frac{840}{1680}$.

5. Reduce, $\frac{4}{5}$, $\frac{2}{3}$, $\frac{3}{7}$, and $\frac{1}{8}$ to a common Denominator.

*Facit* $\frac{672}{840}$, $\frac{560}{840}$, $\frac{360}{840}$, $\frac{105}{840}$.

6. Reduce, $\frac{2}{6}$, $\frac{5}{9}$, $\frac{2}{8}$, and $\frac{1}{5}$ to a common Denominator.

*Facit* $\frac{720}{2160}$, $\frac{1200}{2160}$, $\frac{540}{2160}$, $\frac{1296}{2160}$.

2. *To Reduce a Vulgar Fraction to its* loweſt Terms.

RULE. Find a common Meaſure by dividing the lower Term by the upper, and that Diviſor by the Remainder following, till nothing remain; the laſt Diviſor is the common Meaſure, then divide both Parts of the Fraction by the common Meaſure, and the Quotients will give the Fraction required.

NOTE. *If the common Meaſure happen to be* 1, *the Fraction is already in its loweſt Term; and when a Fraction hath Cyphers at the Right-hand, it may be abbreviated by cutting them off; as* $\frac{4|0}{5|0}$.

### EXAMPLES.

7. Reduce $\frac{24}{32}$ to its loweſt Terms.

$24)32(1$

—

*com. Meaſure.* $8)24(3$

—

*then* $8)\frac{24}{32}(=\frac{3}{4}$. *Facit.*

8. Reduce $\frac{30}{125}$ to its loweſt Terms. *Facit* $\frac{6}{25}$.
9. Reduce $\frac{208}{684}$ to its loweſt Terms. *Facit* $\frac{52}{171}$.
10. Reduce $\frac{192}{576}$ to its loweſt Terms. *Facit* $\frac{1}{3}$.
11. Reduce $\frac{8\ 5}{960}$ to its loweſt Terms. *Facit* $\frac{55}{64}$.
12. Reduce $\frac{5\ 84}{5912}$ to its loweſt Terms. *Facit* $\frac{3}{4}$.

### 3. *To reduce a mixed Number to an improper Fraction.*

RULE. Multiply the whole Number by the Denominator of the Fraction, and to the Product add the Numerator for a new Numerator, which place over the Denominator.

Note, *To expreſs an whole Number Fraction-ways, ſet* 1 *for the Denominator given.*

### EXAMPLES.

13. Reduce 18 $\frac{3}{7}$ to an improper Fraction *Facit* $\frac{129}{7}$.
$18\times7+3=129$ *new Numerator,* $\frac{129}{7}$.
14. Reduce 56 $\frac{13}{22}$ to an improper Fraction. *Facit* $\frac{1245}{22}$.
15. Reduce 183 $\frac{5}{21}$ to an improper Fraction *Facit* $\frac{3848}{21}$.
16 Reduce 13 $\frac{4}{5}$ to an improper Fraction. *Facit* $\frac{69}{5}$.
17. Reduce 27 $\frac{2}{9}$ to an improper Fraction. *Facit* $\frac{245}{9}$.
18. Reduce 514 $\frac{5}{16}$ to an improper Fraction. *Facit* $\frac{8229}{16}$.

### 4. *To Reduce an improper Fraction to its proper Terms.*

RULE. Divide the upper Term by the lower.

### EXAMPLES.

19 Reduce $\frac{129}{7}$ to its proper Terms. *Facit* 18 $\frac{3}{7}$.
$129\div7=18\ \frac{3}{7}$
20. Reduue $\frac{1245}{22}$ to its proper Terms. *Facit* 56 $\frac{13}{22}$.
21. Reduce $\frac{3848}{21}$ to its proper Terms. *Facit* 183 $\frac{5}{21}$.
22. Reduce $\frac{69}{5}$ to its proper Terms. *Facit* 13 $\frac{4}{5}$.
23. Reduce $\frac{245}{9}$ to its proper Terms. *Facit* 27 $\frac{1}{2}$.
24. Reduce $\frac{8229}{16}$ to its proper Terms. *Facit* 514 $\frac{5}{16}$.

### 5. *To reduce a compound Fraction to a ſingle one.*

RULE. Multiply all the Numerators for a new Numerator, and all the Denominators for a new Denominator.

Reduce the new Fraction to its loweſt Terms by Rule 2.

EXAMPLES.

25. Reduce $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{5}{8}$ to a ſingle Fraction.

*Facit* $\frac{2\times3\times5=30}{3\times5\times8=120}$ *reduced to the loweſt Term* $=\frac{1}{4}$.

26. Reduce $\frac{5}{9}$ of $\frac{4}{7}$ of $\frac{11}{12}$ to a ſingle Fraction.

*Facit* $\frac{220}{756}=\frac{55}{189}$.

27. Reduce $\frac{11}{12}$ of $\frac{13}{14}$ of $\frac{21}{29}$ to a ſingle Fraction.

*Facit* $\frac{3003}{4872}=\frac{143}{232}$.

28. Reduce $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{9}{10}$ to a ſingle Fraction.

*Facit* $\frac{135}{240}=\frac{9}{16}$.

29. Reduce $\frac{4}{5}$ of $\frac{3}{8}$ of [illegible] to a ſingle Fraction.

*Facit* [illegible] = [illegible].

30. Reduce [illegible] of [illegible] of [illegible] to a ſingle Fraction.

*Facit* [illegible] = [illegible].

6. *To reduce Fractions of one Denomination to the Fraction of another*, but greater, *retaining the ſame Value.*

RULE. Reduce the given Fraction to a compound one, by comparing it with all the Denominations between it, and that Denomination which you would reduce it to; then reduce that compound Fraction to a ſingle one.

EXAMPLES.

31. Reduce $\frac{7}{8}$ of a Penny to the Fraction of a Pound.

*Facit* $\frac{7}{8}$ of $\frac{1}{12}$ of $\frac{1}{20}=\frac{7}{1920}$ *l.*

32. Reduce $\frac{1}{4}$ of a Penny to the Fraction of a Pound.

*Facit* $\frac{1}{960}$ *l.*

33. Reduce $\frac{4}{5}$ of a *dwt.* to the Fraction of a *lb.* Troy.

*Facit* $\frac{4}{1200}$.

34. Reduce $\frac{4}{7}$ of a *lb.* Avoirdupoiſe to the Fraction of an *cwt.*

*Facit* $\frac{4}{784}$ *cwt.*

7. *To reduce Fractions of one Denomination to the Fraction of another*, but leſs, *retaining the ſame Value.*

RULE. Multiply the Numerator by the Parts contained in the ſeveral Denominations between it, and that you would reduce it to, for a new Numerator, and place it over the given Denominator.

Reduce the new Fraction to its loweſt Terms.

### EXAMPLES.

35. Reduue $\frac{7}{1920}$ of a £. to the Fraction of a Penny.
*Facit* $\frac{7}{8}$ of a Penny.

7×20×12=1680 $\frac{1680}{1920}$ *reduced to the loweſt Terms* = $\frac{7}{8}$ *d.*

36. Reduce $\frac{1}{960}$ of a £. to the Fraction of a Penny.
*Facit* $\frac{1}{4}$ *d.*

37. Reduce $\frac{4}{1200}$ of a *lb.* Troy to the Fraction of a Pennyweight.
*Facit* $\frac{4}{5}$ *dwt.*

38. Reduce $\frac{4}{784}$ of an *cwt.* to the Fraction of a *lb.*
*Facit* $\frac{4}{7}$ *lb.*

8. *To reduce Fractions of one Denomination to another of the ſame Value, having the Numerator given of the required Fraction.*

RULE. As the *Numerator* of the *given Fraction* : is to its *Denominator* : : ſo is the *Numerator* of the *intended Fraction* : to its *Denominator*.

### EXAMPLES.

39. Reduce $\frac{2}{3}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 12. *As* 2 : 3 : : 12 : : 18. *Facit* $\frac{12}{18}$.

40. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 25
*Facit* $\frac{25}{35}$.

41. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 47.
*Facit* $\frac{47}{65}\ \frac{4}{5}$.

9. *To reduce Fractions from one Denomination to another of the ſame Value, having the Denominator given of the Fraction required.*

RULE. As the *Denominator* of the *given Fraction* : is to its *Numerator* : ſo is the *Denominator* of the *intended Fraction* : : to its *Numerator*.

### EXAMPLES.

42. Reduce $\frac{2}{3}$ to a Fraction of the ſame Value, whoſe Denominator ſhall be 18. *As* 3 : 2 : : 18 : 12. *Facit* $\frac{12}{18}$.

43. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Denominator ſhall be 35.
*Facit* $\frac{25}{35}$.

44. Reduce $\frac{5}{7}$ to a Fractian of the ſame Value, whoſe Denominator ſhall be 65 $\frac{4}{5}$.
*Facit* $\frac{47}{65}\ \frac{4}{5}$.

### 10. *To reduce a mixed Fraction to a ſingle one.*

RULE. When the Numerator is the integral Part, multiply it by the Denominator of the fractional Part, adding in the Numerator of the fractional Part, for a new Numerator, then multiply the Denominator of the Fraction by the Denominator of the fractional Part for a new Denominator.

### EXAMPLES.

45. Reduce $\frac{36\frac{2}{3}}{48}$ to a ſimple Fraction. *Facit* $\frac{110}{144}=\frac{55}{72}$.

$36\times3+2=110$ *Numerator.*

$48\times3\quad=114$ *Denominator.*

46. Reduce $\frac{23\frac{5}{7}}{38}$ to a ſimple Fraction. *Facit* $\frac{166}{266}=\frac{83}{133}$.

When the Denominator is the integral Part, multiply it by the Denominator of the fractional Part, adding in the Numerator of the fractional Part for a new Denominator, then multiply the Numerator of the Fraction by the Denominator of the fractional Part for a new Numerator.

### EXAMPLES.

47. Reduce $\frac{47}{66\frac{4}{5}}$ to a ſimple Fraction. *Facit* $\frac{235}{329}=\frac{5}{7}$.

48. Reduce $\frac{19}{41\frac{1}{3}}$ to a ſimple Fraction. *Facit* $\frac{57}{133}=\frac{3}{7}$.

### 11. *To find the proper Quantity of a Fraction in the known Parts of an Integer.*

RULE. Multiply the Numerator by the common Parts of the Integer, and divide by the Denominator.

### EXAMPLSE.

49. Reduce $\frac{3}{4}$ of a Pound *Sterling* to its proper Quantity,
$3\times20=60\div4=15$ *s.* *Facit* 15*s.*

50. Reduce $\frac{2}{5}$ of a Shilling to its proper Quantity.
*Facit* 4*d.* 3 *qrs.* $\frac{1}{5}$.

51. Reduce $\frac{4}{7}$ of a *lb.* Avoirdupoiſe to its proper Quantity.
*Facit* 9 *oz.* 2 *dr.* $\frac{2}{7}$.

52. Reduce $\frac{7}{9}$ of an *cwt.* to its proper Quantity.
*Facit* 3 *qrs.* 3 *lb.* 1 *oz.* 12 *dr.* $\frac{4}{9}$.

53. Reduce $\frac{3}{5}$ of a *lb.* Troy to its proper Quantity.
*Facit* 7 *oz.* 4 *dwt.*

54. Reduce $\frac{5}{9}$ of an Ell *Engliſh* to its proper Quantity.
*Facit* 2 *qrs.* 3 *nails*, $\frac{1}{9}$.

55. Reduce $\frac{4}{5}$ of a Mile to its proper Quantity.
*Facit* 6 *furl.* 16 *poles.*

56. Rednce $\frac{5}{8}$ of an Acre to its proper Quantity.
*Facit* 2 *roods* 20 *poles.*

57. Reduce $\frac{6}{7}$ of an Hogſhead of Wine to its proper Quantity.
*Facit* 54 *Gallons.*

58. Reduce $\frac{3}{9}$ of a Barrel of Beer to its proper Quantity
*Facit* 12 *Gallons.*

59. Reduce $\frac{5}{12}$ of a Chaldron of Coals to its proper Quantity.
*Facit* 15 *Buſh.*

60. Reduce $\frac{3}{5}$ of a Month to its proper Quantity
*Facit* 2 *Weeks*, 2 *Days*, 19 *Hours* $\frac{1}{5}$.

12. *To reduce any given Quantity to the Fraction of any greater Denomination retaining the ſame Value.*

RULE. Reduce the given Quantity to the loweſt Term mentioned for a Numerator, under which ſet the Integral Part (reduced to the ſame Term) for a Denominator, and it will give the Fraction required.

## EXAMPLES.

61. Reduce 15*s.* to the Fraction of a Pound *Sterling.*
*Facit* $\frac{15}{20}=\frac{3}{4}$ £.

62. Reduce 4*d.* 3 *qrs.* $\frac{1}{5}$ to the Fraction of a Shilling.
*Facit* $\frac{2}{5}$.

63. Reduce 9 *oz.* 2 *dr.* $\frac{2}{7}$ to the Fraction of a *lb.* Avoirdupoiſe.
*Facit* $\frac{4}{7}$.

64. Reduce 3 *qrs.* 3 *lb.* 1 *oz.* 12 *dr.* $\frac{4}{9}$ to the Fraction of an *cwt.*
*Facit* $\frac{7}{9}$.

65. Reduce 7 *oz.* 4 *dwt.* to the Fraction of a *lb.* Troy.
*Facit* $\frac{3}{5}$.

66. Reduce 2 *qrs.* 3 *nails* $\frac{1}{9}$ to the Fraction of an *Engliſh* Ell.
*Facit* $\frac{5}{9}$.

67. Reduce 6 *furl.* 16 *poles* to the Fraction of a Mile.
*Facit* $\frac{4}{5}$.

68. Reduce 2 *roods* 20 *poles* to the Fraction of an Acre.
*Facit* $\frac{5}{8}$.

69. Reduce 54 *Gallons* to the Fraction of an Hogſhead of Wine.
*Facit* $\frac{6}{7}$.

70. Reduce 12 *Gallons* to the Fraction of a Barrel of Beer. *Facit* $\frac{3}{9}=\frac{1}{3}$.

71. Reduce 15 *buſh.* to the Fraction of a Chaldron of Coals. *Facit* $\frac{5}{12}$.

72. Reduce 2 *weeks,* 2 *days,* 19 *hours,* $\frac{1}{5}$ to the Fraction of a Month. *Facit* $\frac{3}{5}$.

## ADDITION *of* VULGAR FRACTIONS.

**RULE 1.** RECUCE the given Fractions to a common Denominator, then add all the Numerators together, under which place the common Denominator.

### EXAMPLES.

1. Add $\frac{2}{3}$ and $\frac{5}{7}$ together, *Facit* $\frac{14}{21}+\frac{15}{21}=\frac{29}{21}=1\frac{8}{21}$.
2. Add $\frac{3}{4}$, $\frac{2}{7}$ and $\frac{5}{6}$ together. - - - - - - *Facit* $1\frac{146}{168}$.
3. Add $\frac{1}{5}$, $4\frac{1}{3}$ and $\frac{2}{5}$ together. - - - - - *Facit* $4\frac{70}{75}$.
4. Add $7\frac{2}{3}$ and $\frac{2}{5}$ together. - - - - - - - *Facit* $8\frac{1}{15}$.
5. Add $\frac{2}{7}$ and $\frac{2}{3}$ of $\frac{3}{4}$ together. - - - - - *Facit* $\frac{11}{14}$.
6. Add $5\frac{2}{3}$, $6\frac{7}{8}$ and $5\frac{1}{4}$ together. - - - *Facit* $17\frac{1}{24}$.

2. When the Fractions are of ſeveral Denominations, reduce them to their proper Quantities, and add as before.

7. Add $\frac{3}{4}$ of a Pound to $\frac{5}{6}$ of a Shilling, *Facit* 15*s.* 10*d.*

8. Add $\frac{1}{2}$ of a Penny to $\frac{2}{3}$ of a Pound. *Facit* 13*s.* 4*d* $\frac{1}{2}$.

9. Add $\frac{3}{4}$ of a Pound Troy to $\frac{1}{6}$ of an Ounce. *Facit* 9 *oz.* 3 *dwt.* 8 *gr.*

10. Add $\frac{4}{5}$ of a Ton to $\frac{5}{6}$ of a *lb.* *Facit* 16 *cwt.* 0 *qr.* 0 *lb.* 13 *oz.* 5 *dr.* $\frac{1}{3}$.

11. Add $\frac{2}{3}$ of a Chaldron to $\frac{3}{4}$ of a Buſhel. *Facit* 24 *buſh.* 3 *pecks.*

12. Add $\frac{1}{6}$ of a Yard to $\frac{2}{3}$ of an Inch. *Facit* 6 *inch.* 2 *bar. c.*

## SUBTRACTION *of* VULGAR FRACTIONS.

**RULE 1.** REDUCE the given Fractions to a common Denominator, then ſubtract the leſſer Numerator from the greater, and place the Remainder over the common Denominator.

2. When the lower Fraction is greater than the upper ſubtract the Numerator of the lower Fraction from the De-

nominator, and to that Difference add the upper Numerator, carrying one to the Units Place of the lower whole Number.

### EXAMPLES.

1. From $\frac{3}{4}$, take $\frac{5}{7}$. $3\times7=21$. $5\times4=20$. $21-20=1$ *num.* $4\times7=28$ *den.* *Facit* $\frac{1}{28}$.
2. From $\frac{5}{6}$ take $\frac{3}{5}$ of $\frac{5}{8}$. - - - - - - - - - - - *Facit* $\frac{11}{24}$.
3. From $5\frac{2}{3}$ take $\frac{9}{10}$. - - - - - - - - - - - *Facit* $4\frac{23}{30}$.
4. From $\frac{3}{47}$ take $\frac{3}{5}$. - - - - - - - - - - - - *Facit* $\frac{49}{235}$.
5. From $\frac{19}{20}$ take $\frac{1}{7}$ of $\frac{2}{3}$. - - - - - - - - - *Facit* $\frac{359}{420}$.
6. From $64\frac{1}{2}$ take $\frac{2}{3}$ of $\frac{3}{4}$ - - - - - - - - - *Facit* $63\frac{3}{4}$.

When the Fractions are of ſeveral Denominations, reduce them to their proper Quantities, and ſubtract as before.

7. From $\frac{3}{4}$ of a Pound take $\frac{3}{4}$ of a Shilling. *Facit* 14*s.* 3*d.*
8. From $\frac{2}{3}$ of a Shilling take $\frac{1}{2}$ of a Penny. *Facit* 7*d.* $\frac{1}{2}$.
9. From $\frac{3}{4}$ of a *lb.* Troy, take $\frac{1}{6}$ of an *Ounce.* *Facit* 8 *oz.* 16 *dwt.* 16 *gr.*
10. From $\frac{4}{5}$ of a Ton, take $\frac{5}{6}$ of a *lb.* *Facit* 15 *cwt.* 3 *qrs.* 27 *lb.* 2 *oz.* 10 *dr.* $\frac{2}{3}$.
11. From $\frac{2}{3}$ of a Chaldron, take $\frac{3}{4}$ of a Buſhel. *Facit* 23 *buſh.* 1 *peck.*
12. From $\frac{1}{6}$ of a Yard, take $\frac{2}{3}$ of an Inch. *Facit* 5 *in.* 1 *bc.*

## MULTIPLICATION *of* VULGAR FRACTIONS.

RULE. PREPARE the given Number (if they require it) by the Rules of Reduction, then multiply the Numerators together for a new Numerator, and the Denominators for a new Denominator.

Note. *When any Number, either whole or mixed, is multiplied by a Fraction, the Product will be always leſs than the Multiplicand, in the ſame Proportion as the multiplying Fraction is leſs than an Unit.*

### EXAMPLES.

1. Multiply $\frac{3}{4}$ by $\frac{3}{5}$. *Fa.* $3\times3=9$ *num.* $4\times5=20$ *den.* $=\frac{9}{20}$.
2. Multiply $\frac{7}{9}$ by $\frac{2}{3}$. - - - - *Facit* $\frac{14}{27}$.
3. Multiply $4\frac{3}{5}$ by $15\frac{5}{6}$. - *Facit* $672\frac{9}{30}$.
4. Multiply $430\frac{6}{10}$ by $18\frac{3}{7}$. *Facit* $7935\frac{24}{70}$.

5. Multiply $\frac{16}{21}$ by $\frac{3}{4}$ of $\frac{2}{7}$ of $\frac{4}{5}$. - - - - *Facit* $\frac{96}{24}=\frac{16}{49}$.
6. Multiply $\frac{9}{10}$ by $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{9}$. - - - - *Facit* $\frac{1}{8}$.
7. Multiply $\frac{2}{4}$ of $\frac{2}{3}$ by $\frac{2}{3}$ of $\frac{1}{3}$. - - - - - - *Facit* $\frac{1}{9}$
8. Multiply $\frac{2}{4}$ of $\frac{3}{8}$ by $\frac{5}{7}$. - - - - - - - - - *Facit* $\frac{15}{24}$.
9. Multiply $5\frac{6}{7}$ by $\frac{5}{6}$. - - - - - - - - - - *Facit* $4\frac{37}{42}$.
10. Multiply 24 by $\frac{2}{3}$. - - - - - - - - - - *Facit* 16.
11. Multiply $\frac{3}{4}$ of 9 by $\frac{7}{8}$. - - - - - - - - - *Facit* $5\frac{29}{32}$.
12. Multiply $9\frac{1}{2}$ by $\frac{2}{6}$ - - - - - - - - - - - *Facit* $3\frac{1}{6}$.

## DIVISION *of* VULGAR FRACTIONS.

**Rule.** PREPARE the given Numbers (if they require it) by the rules of Reduction, then multiply the Denominator of the Diviſor into the Numerator of the Dividend for a new Numerator, and the Numerator of the Diviſor into the Denominator of the Dividend for a new Denominator.

Note. *When any whole Number is divided by a Fraction leſs than Unity, the Quotient will be greater than the Dividend. But if any Fraction be divided by a whole Number greater than Unity, the Quotient will be leſs than the Dividend.*

### EXAMPLES.

1. Divide $\frac{9}{20}$ by $\frac{3}{5}$, $5\times9=45$, *mum.* $3\times20=60$ *den.* $\frac{45}{60}=\frac{3}{4}$
2. Divide $\frac{14}{27}$ by $\frac{2}{3}$. - - - - - - - - - - - - - - *Facit* $\frac{7}{9}$.
3. Divide $672\frac{9}{35}$ by $13\frac{5}{6}$. - - - - - - - - - *Facit* $48\frac{3}{5}$.
4. Divide $7935\frac{24}{78}$ by $18\frac{3}{7}$. - - - - - - - - - *Facit* $430\frac{3}{5}$.
5. Divide $\frac{3}{8}$ by $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$. - - - - - - - - - *Facit* $\frac{9}{10}$.
6. Divide $\frac{2}{3}$ of 16 by $\frac{3}{7}$ of $\frac{3}{4}$. - - - - - - - - - *Facit* $19\frac{41}{45}$.
7. Divide $\frac{1}{2}$ of $\frac{2}{3}$ by $\frac{2}{3}$ of $\frac{3}{4}$. - - - - - - - - - - - *Facit* $\frac{24}{36}=\frac{2}{3}$.
8. Divide $9\frac{2}{13}$ by $\frac{1}{2}$ of 7. - - - - - - - - - - *Facit* $\frac{13}{21}$.
9. Divide $\frac{9}{13}$ by $4\frac{1}{2}$. - - - - - - - - - - - - - *Facit* $\frac{1}{8}$.
10. Divide 16 by 24. - - - - - - - - - - - - - - *Facit* $\frac{2}{3}$.
11. Divide $5205\frac{2}{10}$ by $\frac{4}{5}$ of 91. - - - - - - - *Facit* $71\frac{1}{2}$.
12. Divide $3\frac{1}{6}$ by $9\frac{1}{2}$. - - - - - - - - - - - - - *Facit* $\frac{1}{3}$.

*The*

## *The* SINGLE RULE *of* THREE DIRECT, *in* VULGAR FRACTIONS.

RULE. REDUCE the Numbers as before directed in Reduction, ſo that the firſt and third may be of the ſame Name, multiply the Numerator of the firſt Fraction by the Denominator of the ſecond and third, for a new Denominator, then multiply the Denominator of the firſt Fraction by the Numerator of the ſecond and third for a new Numerator, that Fraction will be the Anſwer to the Queſtion, which reduce to its proper Quantity — or when the 3 Terms are properly reduced, proceed as in the Rule of Three of whole Numbers.

### EXAMPLES.

1. If $\frac{3}{4}$ of a Yard coſt $\frac{5}{8}$ of a £. what will $\frac{9}{10}$ of a Yard come to at that Rate? *Anſ.* $\frac{18}{24}$=15*s.*

$\frac{3}{4}$ *yds.* : $\frac{5}{8}$ £. : : $\frac{9}{10}$ *yds.* : $\frac{18}{24}$ £.

*for* $4\times5\times9=180$ *num.*
*and* $3\times8\times10=240$ *den.* *or* $\frac{5}{8}\times\frac{9}{10}=\frac{45}{80}$ $\frac{3}{4})\frac{45}{80}(\frac{180}{240}$,

2. If $\frac{5}{6}$ of a Yard coſt $\frac{2}{3}$ £. what will $\frac{11}{12}$ Yards coſt? *Anſ.* 14*s.* 8*d.*

3. If $\frac{3}{4}$ of a Yard of Lawn coſt 7*s.* 3*d.* what will 9 Yards $\frac{3}{4}$? *Anſ.* £4..19..10 $\frac{1}{2}$ $\frac{2}{3}$.

4. If $\frac{7}{8}$ *lb.* coſt $\frac{3}{4}$ *s.* how many will $\frac{8}{9}$ of *s.* buy? *Anſ.* 1*lb.* $\frac{8}{216}$.

5. If $\frac{3}{5}$ Ell of Holland coſt $\frac{1}{3}$ £. what will 12 Ells $\frac{2}{3}$ coſt at that Rate? *Anſ.* £7..–..8 $\frac{3}{4}$ $\frac{15}{27}$.

6. If 12 $\frac{1}{2}$ Yards of Cloth coſt 15*s.* 9*d.* what will 48 $\frac{1}{4}$. coſt at the ſame Rate? *Anſ.* £3..–..9 $\frac{1}{2}$ $\frac{16}{100}$.

7. If $\frac{9}{10}$ of *cwt.* coſt 284*s.* what will 7 *cwt.* $\frac{1}{2}$ coſt at the ſame Rate? *Anſ.* £118..6..8.

8. If 3 Yards of Broad-cloth coſt £2. $\frac{4}{5}$, will 10 Yards $\frac{2}{7}$ coſt? *Anſ.* £9..12..–.

9. If $\frac{1}{4}$ of a Yard coſt $\frac{2}{3}$ of a £. what will $\frac{3}{5}$ of an Ell *Engliſh* come to at the ſame Rate? *Anſ.* £2.

10, If 1 *lb.* of Cochineal coſt £1..5..–. what will 36 *lb.* $\frac{7}{10}$ come to? *Anſ.* £45..17..6.

11. If 1 Yard of Broad-cloth coſt 15*s.* $\frac{5}{8}$ what will 4 Pieces coſt, each containing 27 Yards $\frac{3}{7}$? *Anſ.* £85..14..3$\frac{1}{4}$ $\frac{40}{56}$.

12. Bought 3 Pieces $\frac{1}{2}$ of Silk, each containing 24 Ells $\frac{3}{8}$, at 6*s.* 0*d.* $\frac{3}{4}$ *per* Ell, I deſire to know what the whole Quantity coſt? *Anſ.* £25..17..2$\frac{1}{4}$ $\frac{1}{16}$.

*The*

## *The* SINGLE RULE *of* THREE INVERSE, *in* VULGAR FRACTIONS.

### EXAMPLES.

1. IF 48 Men can build a Wall in 24 Days $\frac{1}{4}$, how many Men can do the ſame in 192 Days? *Anſ.* 6 *Men* $\frac{4}{7}$.

2. If 25*s.* $\frac{2}{7}$ will pay for the Carriage of an *cwt.* 145 Miles $\frac{1}{4}$, how far may 6 *cwt.* $\frac{1}{2}$ be carried for the ſame Money? *Anſ.* 22 *Miles* $\frac{9}{26}$.

3. If 3 $\frac{1}{2}$ Yards of Cloth, that is $\frac{1}{5}$ Yard wide, be ſufficient to make a Cloak, how much muſt I have of that Sort which is $\frac{4}{5}$ Yard wide, to make another of the ſame Bigneſs? *Anſ.* $\frac{7}{8}$ *Yards.*

4. If 3 Men can do a Piece of Work in 4 Hours $\frac{1}{2}$ in how many Hours will 10 Men do the ſame Work? *Anſ.* 1 *Hour* $\frac{7}{20}$.

5. If a Penny white Loaf weigh 7 *oz.* when a Buſhel of Wheat coſt 5*s* 6*d.* what is the Buſhel worth when the Penny white Loaf weighs but 2 *oz.* $\frac{1}{2}$? *Anſ.* 15*s.* 4*d.* $\frac{4}{5}$.

6. what Quantity of Shalloon that is $\frac{3}{4}$ Yard wide will line 7 $\frac{1}{2}$ Yard of Cloth that is 1 $\frac{1}{2}$? *Anſ.* 15 *Yards.*

## *The* DOUBLE RULE *of* THREE *in* VULGAR FRACTIONS.

### EXAMPLES.

1. IF a Carrier receives £2. $\frac{1}{10}$ for the Carriage of 3 *cwt.* 150 Miles, how much ought he to receive for the Carriage of 7 *cwt.* 3 *qrs.* $\frac{1}{2}$ 50 Miles? *Anſ.* £1..16..9.

2. If £105. in 12 Months gain £6. Intereſt, what Principal will gain £3. $\frac{3}{8}$ in 9 Months; *Anſ.* £75.

3. If 9 Students ſpend £10. $\frac{7}{9}$ in 18 Days, how much will 20 Students ſpend in 30 Days? *Anſ.* £39..18..4. $\frac{169}{455}$

4. A Man and his Wife having laboured one Day, earned 4*s.* $\frac{3}{8}$ how much muſt they have for 10 Days $\frac{1}{2}$, when their two Sons help them? *Anſ.* £4..17..1 $\frac{1}{2}$.

5. If £50. in 5 Months gain £2. $\frac{37}{144}$ what Time will £13. $\frac{1}{3}$ require to gain £1. $\frac{1}{12}$? *Anſ.* 9 *Months.*

6. If the Carriage of 60 *cwt.* 20 Miles coſt £14 $\frac{1}{2}$ what Weight can I have carried 30 Miles for £5. $\frac{7}{16}$? *Anſ.* 15 *cwt.*

# THE

# TUTOR's ASSISTANT.

## PART III.

## DECIMAL FRACTIONS.

IN Decimal Fractions the Integer or whole Thing, as one Pound, one Yard, one Gallon, *&c.* is ſuppoſed to be divided into ten equal Parts, and thoſe Parts into Tenths, and ſo on without End.

So that the Denominator of a Decimal being always known to conſiſt of an Unit, with as many Cyphers as the Numerators has Places, therefore is never ſet down, the Parts being only diſtinguiſhed from whole Numbers by a Comma prefixed; thus, ,5 which ſtands for $\frac{5}{10}$, ,25 for $\frac{25}{100}$, ,123 for $\frac{123}{1000}$.

But the different Value of Figures appears plainer by the following Table.

| Whole Numbers. | | | | | | | Decimal Parts. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| *Millions.* | *C Thouſands.* | *X Thouſands.* | *Thouſands.* | *Hundreds.* | *Tens.* | *Units.* | *Parts of Tens.* | *Parts of Hundreds.* | *Parts of Thouſands.* | *Parts of X Thouſands.* | *Parts of C Thouſands.* | *Parts of Millions.* |

From

From which it plainly appears, that as whole Numbers increaſe in a ten-fold Proportion to the Left-Hand, Decimal Parts decreaſe in a ten-fold Proportion to the Right hand, ſo that Cyphers placed before Decimal Parts decreaſe their Value, by removing them farther from the Comma or Unit's Place; thus, ,5 is 5 parts of 10, or $\frac{5}{10}$. ,05 is 5 Parts of 100, or $\frac{5}{100}$. ,005 is 5 parts of 1000, or $\frac{5}{1000}$. ,0005 is 5 Parts of 10000. or $\frac{5}{10000}$. But Cyphers after Decimal Parts do not alter their Value. For, ,5 ,50 ,500, *&c.* are each but $\frac{5}{10}$ of the Unit.

A **FINITE DECIMAL** is that which ends at a certain Number of Places, but an Infinite is that which no where ends.

A **RECURRING DECIMAL** is that wherein one or more Figures are continually repeated, as 2,75222.

And 52, 275275275 is called a compound recurring Decimal.

Note. *A finite Decimal may be conſidered as infinite, by making Cyphers to recur, for they do not alter the Value of the Decimal.*

*In all Operations, if the Reſult conſiſts of ſeveral Nines, reject them, and make the next ſuperior Place an Unit more*; thus, for 26,25999, write 26,6.

*In all circulating Numbers daſh the firſt Figure*; thus, 86,54$\not{8}$66.

## ADDITION *of* DECIMALS.

RULE. IN ſetting down the propoſed Numbers to be added, great Care muſt be taken in placing every Figure directly underneath thoſe of the ſame Value, whether they be mixed Numbers, or pure Decimal Parts, and to perform which there muſt be a due Regard had to the Comma's, or ſeparating Points, which ought always to ſtand in a direct Line, one under another, and to the Right-hand of them carefully place the Decimal Parts, according to their reſpective Values, then add them as in whole Numbers.

### EXAMPLES.

1. Add 72,5 + 32,071 + 2,1574 + 371,4 + 2,75 *Facit* 480.8784
2. Add 30,07 + 2.0071 + 59.4 + 3207,1.
3. Add 3.5 + 47,25 + 927.01 + 2.0073 + 1,5.
4. Add 52,75 + 47,21 + 724 + 31,452 + ,3075.
5. Add 3275 + 27,514 + 1,005 + 725 + 7,32.
6. Add 27,5 + 52 + 3,2075 + ,5741 + 2710.

SUB-

## SUBTRACION *of* DECIMALS.

RULE. SUBTRACTION of Decimals differs but little from whole Numbers, only in placing your Numbers, which muſt be carefully obſerved, as in Addition.

### EXAMPLES.

1. From ,2754 take ,2371
2. From 2.37 take 1,76
3. From 271 take 215,7
4. From 270,2 take 75.4075
5. From 571 take 54.72
6. From 625 take 76,91
7. From 23.415 take ,3742
8. From ,107 take ,0007

## MULTIPLICATION *of* DECIMALS.

RULE. PLACE the Factors, and multiply them as in whole Numbers, and from the Product towards the Right-hand, cut off as many Places for Decimals as there are in both Factors together; but if there ſhould not be ſo many places in the Product, ſupply the Defect with Cyphers to the Left hand:

### EXAMPLES.

1. Multiply ,2365 by ,2435. *Facit.* ,05758775.

2. Multiply 2,071 by 2,27
3. Multiply 27,15 by 25,3
4. Multiply 79.347 by 23,15
5. Multiply 17105 by ,3257
6. Multiply 17105 by ,0237
7. Multiply 27,35 by 7.0071
8. Multiply 5,721 by ,0075
9. Multiply ,007 by 907
10. Multiply 2,015 by ,[illegible]05
11. Multiply ,0007 by ,0[illegible]25

When any Number of Decimals is to be multiplied by 10, 100, 1000, &c. it is only removing the ſeparating Point in the Multiplicand, ſo many Places towards the Right-hand as there are Cyphers in the Multiplier, thus, ,578 × 10 = 5,78 ,578 × 100 = 57,8 ,578 × 1000 = 578, ,578 × 10000 = 5780.

## *Contracted* MULTIPLICATION *of* DECIMALS.

**RULE.** PUT the Units Place of the Multiplier under that Place of the Multiplicand that is intended to be kept in the Product ? then invert the Order of all the other Figures, *i. e.* write them all the contrary Way; then in multiplying, begin at the Figure in the Multiplicand which ſtands over the Figure you are then multiplying withal, and ſet down the firſt Figure of each particular Product, directly one under the other, and have a due Regard to the increaſe ariſing from the Figures on the Right hand of that Figure you begin to multiply at in the Multiplicand.

Note *that in multiplying the Figure left out every Time next the Right-hand in the Multiplicand, if the Product be* 5, *or upwards, to* 15 *carry* 1, *if* 15, *or upwards, to* 25 *carry* 2, *and if* 25, *or upwards, to* 35 *carry* 3, &c.

### EXAMPLES.

12. Multiply 384,672158 by 36,8345 and let there be only 4 Places of Decimals in the Product. *Facit* 14169,2065,

| *Contracted Way.* | *Common Way.* | |
|---|---|---|
| 384,672158 | 384,672148 | |
| 5438,63 | 36,8345 | |
| 115401647 | 1923 | 360790 |
| 23080329 | 15386 | 88632 |
| 3077377 | 115401 | 6474 |
| 115402 | 3077377 | 264 |
| 15387 | 23080329 | 48 |
| 1923 | 115401647 | 4 |
| 14169,2065 | 14169,2066 | 038510 |

13. Multiply 3,141592 by 52,7438 and leave only 4 Places of Decimals. *Facit* 165,6994.

14. Multiply 2,38645 by 8,2175 and leave only 4 Places of Decimals. *Facit* 19,6107.

15. Multiply 375,13758 by 16,7324 and let there be only one Place of Decimals. *Facit* 6276,9.

16. Multiply 375,13758 by 16,7324 and leave only 4 Places of Decimals. *Facit* 6276,9520.

17. Multiply 395,3756 by ,75642 and let there be only 4 Places of Decimals. *Facit* 299,0699.

# DIVISION of DECIMALS.

THIS Rule is alſo worked as in whole Numbers, the only Difficulty is in valuing the Quotient, which is done by either of the following general Rules.

RULE 1. The firſt Figure in the Quotient is always of the ſame Value with that Figure of the Dividend, which anſwers or ſtands over the Place of Units in the Diviſor.

2. The Quotient muſt always have ſo many Decimal Places, as the Dividend has more than the Diviſor.

Note. *If the Diviſor and Dividend have both the ſame Number of Decimal Parts, the Quotient will be a whole Number.*

2. *If the Dividend hath not ſo many Places of Decimals as are in the Diviſor, then ſo many Cyphers muſt be annexed to the Dividend, as will make them equal, and the Quotient will then be all an whole Number.*

3. *But if when the Diviſion is done, the Quotient has not ſo many Figures as it ſhould have Places of Decimals, then ſo many Cyphers muſt be prefixed as there are Places wanting.*

## EXAMPLES.

1. Divide 85643,825 by 6,321. *Facit* 13549.

2. Divide 48 by 144
3. Divide 217,75 by 65
4. Divide ,125 by ,1045
5. Divide ,709 by 2,574
6. Divide 5,714 by 8725
7. Divide 7382,54, by 6,4252
8. Divide ,08516438 by 423
9. Divide 267,15975 by 13,25
10. Divide 72,1564 by ,1347
11. Divide 715 by ,3075

When Numbers are to be divided by 10, 100, 1000, 10000, *&c.* it is performed by placing the ſeparating Point in the Dividend ſo many Places towards the Left-hand, as there are Cyphers in the Diviſor.

*Thus,* $5784 \div 10 = 578{,}4$  $5784 \div 1000 = 5{,}784$

$5784 \div 100 = 57{,}84$  $5784 \div 10000 = {,}5784$

## *Contracted* DIVISION *of* DECIMALS.

RULE. BY the firſt Rule, find what is the Value of the firſt Figure in the Quotient, then by knowing the firſt Figure's Denomination, the Decimal Places may be reduced to any Number, by taking as many of the Left-hand Figures of the Dividend as will anſwer them : And in dividing, omit one Figure of the Diviſor at each following Operation.

Note. *That in multiplying every Figure left out in the Diviſor you muſt carry* 1, *if it be* 5, *or upwards, to* 15 ; *if* 15 *or upwards, to* 25 *carry* 2, *if* 25, *or upwards, to* 35 *carry* 3, &c.

### EXAMPLES.

12. Divide 721,17562 by 2,257432, and let there be only three Places of Decimals in the Quotient.

| *Contracted.* | *Common Way.* | |
|---|---|---|
| 2,257432)721,17562(319,467 | 2,257432)721,17562(319,467 | |
| . . . . . 6772296 | 6772296 | |
| 439460 . | 439460 | 2 |
| 225743 . | 225743 | 2 |
| 213717 . . | 213717 | 00 |
| 203169 . . | 203168 | 88 |
| 10548 . . . | 10548 | 120 |
| 9030 . . . | . 9029 | 728 |
| 1518 . . . . | 1518 | 3900 |
| 1354 . . . . | 1354 | 4592 |
| 164 . . . . . | 164 | 93280 |
| 158 . . . . . | 158 | 02024 |
| . 6 | . . 5 | 91256 |

13. Divide 8,758615 by 5,2714167
14. Divide ,1717591 by 8,7586
15. Divide 25,1367 by 217,35
16. Divide 51[illegible],7549 by ,123415
17. Divide 70,23 - - by 7,9863
18. Divide 27,104 - - by 3,712

# REDUCTION *of* DECIMALS.

## *To reduce a Vulgar Fraction to a Decimal.*

**RULE.** ADD Cyphers to the Numerator, and divide by the Denominator, the Quotient is the Decimal Fraction required.

### EXAMPLES.

1. Reduce $\frac{1}{4}$ - - - to a Decimal. 4)1,00(,25 *Facit.*
2. Reduce $\frac{1}{2}$ - - - to a Decimal. *Facit* ,5
3. Reduce $\frac{3}{4}$ - - - to a Decimal. *Facit* ,75
4. Reduce $\frac{3}{8}$ - - - to a Decimal. *Facit* ,375
5. Reduce $\frac{5}{26}$ - - to a Decimal. *Facit* ,1923076+
6. Reduce $\frac{11}{14}$ of $\frac{10}{13}$ to a Decimal. *Facit* ,6043956+

NOTE. *If the given Parts are of ſeveral Denominations, they may be reduced either by ſo many diſtinct Operations, as there are different Parts, or by firſt reducing them into their loweſt Denomination, and then divide as before; or,*

2dly, *Bring the loweſt into Decimals of the next ſuperior Denomination, and on the Right-hand of the Decimal found, place the Parts given of the next ſuperior Denomination, ſo proceeding till you bring out the Decimal Parts of the higheſt Integer required by ſtill dividing the Product by the next ſuperior Denominator*; or

3dly, *To Reduce Shillings, Pence, and Farthings; if the Number of Shillings be even, take Half for the firſt Place of Decimals, and let the ſecond and third Places be filled up with the Farthings contained in the remaining Pence and Farthings, always remembering to add* 1, *when it is or exceeds* 25: *But if the Number of Shillings be odd, the ſecond Place of Decimals muſt be increaſed by* 5.

7. Reduce 5*s.* to the Decimal of a £. *Facit* ,25
8. Reduce 9*s.* to the Decimal of a £. *Facit* ,45
9. Reduce 16*s.* to the Decimal of a £. *Facit* ,8

10. Reduce 8*s.* 4*d.* to the Decimal of a £. *Facit* ,416

11. Reduce 16*s.* 7*d.* ¾ to the Decimal of a £.
*Facit* ,8322916.

| *firſt.* | *ſecond.* | *third.* | |
|---|---|---|---|
| 16*s.* 7*d.* ¾. | 4)3,00 | 1)16 | 7 ¾ |
| 12 | | | 4 |
| | 12)7,75 | ,832 | |
| 199 | | | 32 |
| 4 | 2\|0)16,64583 | | |
| 960)799(,8322916 | ,8322916 | | |

12. Reduce 19*s.* 5*d.* ½. to the Decimal of a £.
*Facit* ,972916.

13 Reduce 12 Grains to the Decimal of a *lb.* Troy.
*Facit* ,002083.

14. Reduce 12 Drams to the Decimal of a *lb.* Avoirdupoiſe. *Facit* ,046875.

15. Reduce 2 Quarters, 14 *lb.* to the Decimal of an *Cwt.*
*Facit* ,625

16 Reduce 2 Furlongs to the Decimal of a League.
*Facit*, 083

17. Reduce 2 Quarts, 1 Pint to the Decimal of a Gallon,
*Facit* ,625

18. Reduce 4 Gallons, 2 Quarts of Wine to the Decimal of an Hogſhead. *Facit* ,07142+.

19 Reduce 2 Gallons, 1 Quart of Beer to the Decimal of a Barrel. *Facit* ,0625

20. Reduce 52 Days to the Decimal of a Year.
*Facit* ,142465+.

### *To find the Value of any* Decimal Fraction *in the known Parts of an* Integer.

RULE. Multiply the Decimal given by the Number of Parts of the next inferior Denomination, cutting off the Decimals from the Product; then multiply the Remainder by the next inferior Denomination, thus proceeding till you have brought it in the leaſt known Parts of an Integer.

### EXAMPLES.

21. What is the Value of ,8322916 of a *£*. *Anſ.* 16*s.* 7*d.* ½+

```
       20
---------
16,6458320
       12
---------
 7,7499840
        4
---------
½,9999360
```

22. What is the Value ,002084 of a *lb.* Troy?
*Anſ.* 12,00384 *qrs.*

23. What is the Value of ,046875 of a *lb.* Avoirdupoiſe?
*Anſ.* 12 *Drams.*

14. What is the Value of ,625 of an *Cwt.*
*Anſwer* 2 *qrs.* 14 *lb.*

25 What is the Value of ,625 of a Gallon?
*Anſ.* 2 *quarts*, 1 *pint.*

26. What is the Value of ,071428 of a Hogſhead of Wine?
*Anſ.* 4 *gallons*, 1 *quart.* ,999856.

27. What is the Value of ,0625 of a Barrel of Beer?
*Anſ.* 2 *gallons*, 1 *quart.*

28. What is the Value of ,142465 of a Year?
*Anſ.* 51,999725 *days.*

## TABLE I.
ENGLISH COIN
1 *L*. the Integer.

| *Sh* | *dec.* | *Sh* | *dec.* |
|---|---|---|---|
| 19 | ,95 | 9 | ,45 |
| 18 | ,9 | 8 | ,4 |
| 17 | ,85 | 7 | ,35 |
| 16 | ,8 | 6 | ,3 |
| 15 | ,75 | 5 | ,25 |
| 14 | ,7 | 4 | ,2 |
| 13 | ,65 | 3 | ,15 |
| 12 | ,6 | 2 | ,1 |
| 11 | ,55 | 1 | ,05 |
| 10 | ,5 | | |

| *Pence.* | *Decimals.* |
|---|---|
| 6 | ,025 |
| 5 | ,020833 |
| 4 | ,016666 |
| 3 | ,0125 |
| 2 | .008333 |
| 1 | ,004166 |

| *Farthings* | *Decimals.* |
|---|---|
| 3 | ,003125 |
| 2 | ,0020833 |
| 1 | ,0010416 |

## TABLE II.
ENG. COIN. 1 *Sh.*
Long Mea. 1 *Foot.*
The Integer.

| *Pence.* and *Inches.* | *Decimals.* |
|---|---|
| 6 | ,5 |
| 5 | ,416666 |
| 4 | ,333333 |
| 3 | ,25 |
| 2 | ,166666 |
| 1 | ,083333 |

| *Farthings* | *Decimals* |
|---|---|
| 3 | ,0625 |
| 2 | ,041666 |
| 1 | ,020833 |

## TABLE III
TROY WEIGHT.
1*lb*. The Integer.

*Ounces the ſame as Pence in the laſt* Table.

| *Penny weight.* | *Decimal.* |
|---|---|
| 10. | ,041666 |
| 9 | ,0375 |
| 8 | ,033333 |
| 7 | ,029166 |
| 6 | ,025 |
| 5 | ,020833 |
| 4 | ,016666 |
| 3 | ,0125 |
| 2 | ,008333 |
| 1 | ,004166 |

| *Grains.* | *Decimals.* |
|---|---|
| 12 | ,002083 |
| 11 | ,001910 |
| 10 | ,001736 |
| 9 | ,001562 |
| 8 | ,001389 |
| 7 | ,001215 |
| 6 | ,001042 |
| 5 | ,000868 |
| 4 | ,000694 |
| 3 | ,000521 |
| 2 | ,000347 |
| 1 | ,000173 |

1 Oz. the Integer.
*Penny wt. the ſame. as Sh. in the firſt* Table.

| *Grains.* | *Decimals* |
|---|---|
| 12 | ,025 |
| 11 | ,022916 |
| 10 | ,020833 |
| 9 | ,01875 |
| 8 | ,016666 |
| 7 | ,014583 |
| 6 | ,0125 |
| 5 | ,010416 |
| 4 | ,008333 |
| 3 | ,00625 |
| 2 | ,004166 |
| 1 | ,002083 |

## TABLE IV.
AVOIRDUP. Wt.
112*lb*. the Integer.

| *Qrs.* | *Decimals.* |
|---|---|
| 3 | ,75 |
| 2 | ,5 |
| 1. | ,25 |

| *Pounds.* | *Decimals.* |
|---|---|
| 14 | ,125 |
| 13 | ,116071 |
| 12 | ,107143 |
| 11 | ,098214 |
| 10 | ,089286 |
| 9 | ,080357 |
| 8 | ,071428 |
| 7 | ,0625 |
| 6 | ,053571 |
| 5 | ,044643 |
| 4 | ,035714 |
| 3 | ,026786 |
| 2. | ,017857 |
| 1 | ,008928 |

| *Ounces.* | *Decimals* |
|---|---|
| 8 | ,00446 |
| 7 | ,003906 |

| | |
|---|---|
| 6 | ,003348 |
| 5 | ,002790 |
| 4 | ,002232 |
| 3 | ,001674 |
| 2 | ,001116 |
| 1 | ,000558 |

| ¼ *Oz.* | *Decimals.* |
|---|---|
| 3 | ,000418 |
| 2 | ,000279 |
| 1 | ,000139 |

## TABLE V.
### AVOIRDUP Wt.
### 1 *lb.* the Integer.

| *Ounces.* | *Decimals.* |
|---|---|
| 8 | ,5 |
| 7 | ,4375 |
| 6 | ,375 |
| 5 | ,3125 |
| 4 | ,25 |
| 3 | ,1875 |
| 2 | ,125 |
| 1 | ,0625 |

| *Drams.* | *Decimals.* |
|---|---|
| 8 | ,03215 |
| 7 | ,027343 |
| 6 | ,023437 |
| 5 | ,019531 |
| 4 | ,015625 |
| 3 | ,011718 |
| 2 | ,007812 |
| 1 | ,003906 |

## TABLE VI.
### LIQUID MEAS.
### 1 Tun the Integer.

| *Gall.* | *Decimals.* |
|---|---|
| 100 | ,396825 |
| 90 | ,357141 |
| 80 | ,317460 |
| 70 | ,27 |
| 60 | ,238095 |
| 50 | ,198412 |
| 40 | ,158730 |
| 30 | ,119047 |
| 20 | ,079365 |
| 10 | ,039682 |
| 9 | ,035714 |
| 8 | ,031746 |
| 7 | ,027 |
| 6 | ,023809 |
| 5 | ,019841 |
| 4 | ,015873 |
| 3 | ,011904 |
| 2 | ,007936 |
| 1 | ,003968 |

| *Pints.* | *Decimals.* |
|---|---|
| 4 | ,001984 |
| 3 | ,001488 |
| 2 | ,000992 |
| 1 | ,000496 |

### A Hogſhead the Integer.

| *Gallons.* | *Decimals.* |
|---|---|
| 30 | ,476190 |
| 20 | ,317460 |
| 10 | ,158730 |
| 9 | ,142857 |
| 8 | ,126984 |
| 7 | ,111111 |
| 6 | ,095238 |
| 5 | ,079365 |
| 4 | ,063492 |
| 3 | ,047619 |
| 2 | ,031746 |
| 1 | ,015873 |

| *Pints.* | *Decimals.* |
|---|---|
| 3 | ,005952 |
| 2 | ,003968 |
| 1 | ,001984 |

## TABLE VII.
### MEASURE
### *Liquid.* *Dry.*
### 1 *Gallon,* 1 *Quarter.* Integer.

| *Pint.* | *Decim.* | *Buſh.* |
|---|---|---|
| 4 | ,5 | 4 |
| 3 | ,375 | 3 |
| 2 | ,25 | 2 |
| 1 | ,125 | 1 |

| *Qt.* | *Decim.* | *Peck.* |
|---|---|---|
| 3 | ,09375 | 3 |
| 2 | 0025 | 2 |
| 1 | ,03125 | 1 |

| *Decimals.* | *Q. Pk.* |
|---|---|
| ,0234375 | 3 |
| ,015625 | 2 |
| ,0078125 | 1 |

| *Decimals* | *Pints.* |
|---|---|
| ,005859 | 3 |
| ,003906 | 2 |
| ,001953 | 1 |

## TABLE VIII.
### LONG MEASURE.
### 1 Mile the Integer.

| *Yards.* | *Decimals.* |
|---|---|
| 1000 | ,568182 |
| 900 | ,511364 |
| 800 | ,454545 |
| 700 | ,397727 |
| 600 | ,340909 |

| | |
|---|---|
| 500 | ,284091 |
| 400 | ,227272 |
| 300 | ,170454 |
| 200 | ,113636 |
| 100 | ,056818 |
| 90 | ,051136 |
| 80 | ,045454 |
| 70 | ,039773 |
| 60 | ,034091 |
| 50 | .028409 |
| 40 | ,022727 |
| 30 | ,017045 |
| 20 | ,011364 |
| 10 | ,005682 |
| 9 | ,005114 |
| 8 | ,004545 |
| 7 | ,003977 |
| 6 | ,003409 |
| 5 | ,002841 |
| 4 | ,002273 |
| 3 | ,001704 |
| 2 | ,001136 |
| 1 | ,000568 |

| *Feet.* | *Decimals.* |
|---|---|
| 2 | ,0003787 |
| 1 | ,0001894 |

| *Inch.* | *Decimals.* |
|---|---|
| 6 | ,0000947 |
| 3 | ,0000474 |
| 1 | ,0000158 |

## TABLE IX.
## TIME.

1 Year the Integer.

*Months the ſame as Pence, in the ſecond Table.*

| *Days.* | *Decimals.* |
|---|---|
| 365 | 1,000000 |
| 300 | ,821918 |
| 200 | ,547945 |
| 100 | ,273973 |
| 90 | .246575 |
| 80 | ,219178 |
| 70 | ,191781 |
| 60 | ,164383 |
| 50 | ,136986 |
| 40 | ,109589 |
| 30 | ,082192 |
| 20 | ,054794 |
| 10 | ,027397 |
| 9 | ,024657 |
| 8 | ,021918 |
| 7 | ,019178 |
| 6 | ,016438 |
| 5 | ,013698 |
| 4 | ,010959 |
| 3 | ,008219 |
| 2 | ,005479 |
| 1 | ,002739 |

1 Day the Integer.

| *Hours.* | *Decimals.* |
|---|---|
| 12 | ,5 |
| 11 | ,458333 |
| 10 | ,416666 |
| 9 | ,375 |
| 8 | ,333333 |
| 7 | ,291666 |
| 6 | ,25 |
| 5 | ,208333 |
| 4 | ,166665 |
| 3 | ,125 |
| 2 | .083333 |
| 1 | ,041666 |

| *Minu.* | *Decimals.* |
|---|---|
| 30 | ,020833 |
| 20 | ,013888 |
| 10 | ,006944 |
| 9 | ,00625 |
| 8 | ,005555 |
| 7 | ,004861 |
| 6 | ,004166 |
| 5 | ,003472 |
| 4 | ,002777 |
| 3 | ,002083 |
| 2 | ,001388 |
| 1 | ,000694 |

## TABLE X.
## CLOTH MEASURE.

1 Yard the Integer.

*Qrs. the ſame as* Table 4.

| *Nails.* | *Decimals.* |
|---|---|
| 2 | ,125 |
| 1 | ,0625 |

## TABLE XI.
## LEAD WEIGHT.

A fother the Int.

| *Hund.* | *Decimals.* |
|---|---|
| 10 | ,512820 |
| 9 | ,461538 |
| 8 | .410256 |
| 7 | ,358974 |
| 6 | ,307692 |
| 5 | ,256410 |
| 4 | ,205128 |
| 3 | ,153846 |
| 2 | ,102564 |
| 1 | ,051282 |

| *Qrs.* | *Decimals.* |
|---|---|
| 2 | ,025641 |
| 1 | ,012820 |

| *Pounds.* | *Decimals.* |
|---|---|
| 14 | ,0064102 |
| 13 | ,0059523 |
| 12 | ,0054945 |
| 11 | ,0050366 |
| 10 | ,0045787 |
| 9 | ,0041208 |
| 8 | .0036630 |
| 7 | ,0032051 |
| 6 | ,0027472 |
| 5 | ,0022893 |
| 4 | ,0018315 |
| 3 | ,0013736 |
| 2 | ,0009157 |
| | ,0004573 |

# *The* RULE *of* THREE *in* DECIMALS.

### EXAMPLES.

1. IF 26½ Yards coſt £3..16..3. what will 32 Yards and a Quarter come to?

*Yds.* £. *Yds.*
26,5 : 3,8125 : : 32,25 :
32.25

26,5)122,953125)4,6397=£4..12..9½

2. What will the Pay of 540 Men come to at £1..5..6. *per* Man? *Anſ.* £688..10..—.

3. If 7¾ Yards of Cloth coſt £2..12..9. what will 140½ Yards of the ſame coſt? *Anſ.* £47..16..3. 2,4 *qrs.*

4. If a Cheſt of Sugar, weighing 7 *cwt.* 2 *qrs.* 14 *lb.* coſt £36..12..9. what will 2 *cwt.* 1 *qr.* 21 *lb.* of the ſame coſt? *Anſ.* £11..14..2. 3,5 *qrs.*

5. A Grocer buys 24 *Tun.* 12 *cwt.* 2 *qrs.* 14 *lb.* 12 *oz.* of Tobacco for £3678..6..4 what will 1 *oz.* come to? *Anſ.* 1*d.*

6. What will 326 *lb.* 1 *qr.* of Tobacco come to, when 1 *lb.* ½ is ſold for 3 *s.* 6*d.* *Anſ.* £38..1..3.

7. What is the Worth of 19 *oz.* 3 *dwt.* 5 *gr.* of Gold, at £2..19..—. *per oz.* *Anſ.* £56..10..5. 2,998 *qrs.*

8. What is the Worth of 827 Yards ¾ of Painting, at 10*d.* ½ *per* Yard? *Anſ.* £36..4..3. 1,5 *qr.*

9. If I lent my Friend £34. for ⅝ of a Year, how much ought he to lend me 5/12 of a Year to requite my Kindneſs? *Anſ.* £51

10. If ¾ of a Yard of Cloth, that is 2 Yards one Quarter broad make a Garment, how much that is ⅘ of a Yard wide will make the ſame? *Anſ.* 2,109375 *yards.*

11. If 1 Ounce of Silver coſt 5 *s.* 6 *d.* what is the Price of a Tankard that weighs 1 *lb.* 10 *oz.* 10 *dwt.* 4 *grains*? *Anſ.* £6..3..9. 2,2 *grains.*

12. If 1 *lb.* of Tobacco coſt 15 *d.* what coſt 3 Hogſheads, weighing together 15 *cwt.* 1 *qr.* 19 *lb.*? *Anſ.* £107..18..10.

13. If 1 *cwt.* of Currants coſt £2..9..6. what will 45 *cwt.* 3 *qrs.* 14 *lb.* coſt at the ſame Rate? *Anſ.* £113..10..9. 3 *qrs.*

14. Bought

14. Bought 6 Cheſts of Sugar, each 6 *cwt.* 3 *qrs.* at £2..16..–. *per cwt.* what do they come to? *Anſ* 113..8.

15. Bought a Tankard for £10..12..– at the Rate of 5 *s.* 4 *d. per* Ounce, what was the Weight? *Anſ.* £39 *oz.* 15 *dwt.*

16. Gave £187..3..3. for 25 *cwt.* 3 *qrs.* 14 *lb.* of Tobacco, at what Rate did I buy it at *per lb*? *Anſ.* 15 *d* 2 *qrs.*

17. Bought 29 *lb.* 4 *oz.* of Coffee for £10..11..3. what is the Value of 3 *lb.*? *Anſ.* £1..1..8.

18. If I gave 1 *s.* 1 *d.* for 3 *lb.* ½ of Cheeſe, what will be the Value of 1 *cwt.*? *Anſ.* £1..14..8.

## EXTRACTION *of the* SQUARE ROOT.

EXtracting the Square Root is to find out ſuch a Number as being multiplied into itſelf, the Product will be equal to the given Number.

RULE. *Firſt*, Point the given Number, beginning at the Unit's Place, then to the Hundreds, and ſo upon every ſecond Figure throughout.

*Secondly*, Seek the greateſt Square Number in the firſt Point, towards the Left-hand, placing the Square Number under the firſt Point, and the Root thereof in the Quotient; ſubtract the Square Number from the firſt Point, and to the Remainder bring down the next Point, and call that the Reſolvend.

*Thirdly*, Double the Quotient, and place it for a Diviſor on the Left-hand of the Reſolvend; ſeek how often the Diviſor is contained in the Reſolvend (reſerving always the Unit's Place) and put the Anſwer in the Quotient, and alſo on the Right-hand Side of the Diviſor; then multiply by the Figure laſt put in the Quotient, and ſubtract the Product from the Reſolvend, bring down the next Point to the Remainder (if there be any more) and proceed as before.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ROOTS | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
| SQUARES. | 1. | 4. | 9. | 16. | 25. | 36. | 49. | 64. | 81. |

### EXAMPLES.

1. What is the Square Root of 119025 ? *Anſ.* 345.

$$\begin{array}{r l} & \dot{1}1\dot{9}0\dot{2}5(345 \\ & 9 \\ \hline 64) & 290 \\ & 256 \\ \hline 685) & 3425 \\ & 3425 \\ \hline \end{array}$$

2. What is the Square Root of 106929 ? *Anſ.* 327
3. What is the Square Root of 2268741 ? *Anſ.* 1506,23+
4. What is the Square Root of 7596796 ? *Anſ.* 2756,228+
5. What is the Square Root of 36372961 ? *Anſ.* 6031
6. What is the Square Root of 22071204 ? *Anſ.* 4698

When the given Number conſiſts of a whole Number, and Decimals together, make the Number of Decimals even, by adding Cyphers to them, ſo that there may be a Point fall on the Unit's Place of the whole Number.

7. What is the Square Root of 3271,4007 ? *Anſ.* 57,19+
8. What is the Square Root of 4795, 5731? *Anſ.* 69,247+
9. What is the Square Root of 4,372594 ? *Anſ.* 2,091+
10. What is the Square Root of 2,2710957? *Anſ.* 1,50701+
11. What is the Square Root of ,00032754? *Anſ.* ,01809+
12. What is the Square Root of 1,270054 ? *Anſ.* 1,1269+

### *To* extract *the* Square Root *of a* VULGAR FRACTION.

RULE. Reduce the Fraction to its loweſt Terms, then extract the Square Root of the Numerator for a new Numerator, and the Square Root of the Denominator for a new Denominator.

*If the Fraction be a Surd,* (i. e.) *a Number where a Root can never be exactly found, reduce it to a Decimal, and extract the Root from it.*

### EXAMPLES.

13. What is the Square Root of $\frac{2304}{5184}$ ? *Anſ.* $\frac{2}{3}$.
14. What is the Square Root of $\frac{2704}{4225}$ ? *Anſ.* $\frac{4}{5}$.
15. What is the Square Root of $\frac{9216}{12544}$ ? *Anſ.* $\frac{6}{7}$.

## S U R D S.

16. What is the Square Root of $\frac{275}{341}$? *Anſ.* ,89802 +
17. What is the Square Root of $\frac{57}{76}$? *Anſ.* ,86602 +
18. What is the Square Root of $\frac{478}{549}$? *Anſ.* ,93308 +

### *To extract the* Square Root *of a* MIXED NUMBER.

RULE. Reduce the Fractional Part of the mixed Number to its loweſt Term, and then the mixed Number to an Improper Fraction.

*2dly.* Extract the Roots of the Numerator and Denominator for a new Numerator and Denominator.

*If the mixed Number given be a Surd, reduce the Fractional Part to a Decimal, annex it to the whole Number, and extract the Square Root therefrom.*

### EXAMPLES.

19. What is the Square Root of $51\frac{21}{25}$? *Anſ.* $7\frac{1}{5}$.
20. What is the Square Root of $27\frac{9}{16}$? *Anſ.* $5\frac{1}{4}$.
21. What is the Square Root of $9\frac{43}{49}$? *Anſ.* $3\frac{1}{7}$.

## S U R D S.

22. What is the Square Root of $85\frac{14}{15}$? *Anſ.* 9,27 +
23. What is the Square Root of $8\frac{5}{7}$? *Anſ.* 2,9519 +
24. What is the Square Root of $6\frac{2}{3}$? *Anſ.* 2,5298 +

### *The* APPLICATION.

1. There is an Army conſiſting of a certain Number of Men, who are placed Rank and File, that is, in the Form of a Square, each Side having 576 Men, I deſire to know how many the whole Square contains? *Anſ.* 331776.

2. A certain Pavement is made exactly ſquare, each Side of which contains 97 Feet, I demand how many ſquare Feet are contained therein? *Anſ.* 9409.

### *To find a mean Proportional between any two given Numbers.*

RULE. The Square Root of the Product of the given Numbers is the mean Proportional ſought.

### EXAMPLES.

27. What is the mean Proportional between 3 and 12?
*Anſ.* $3 \times 12 = 36$ *then* $\sqrt{36} = 6$ *the mean Proportion.*

28. What is the mean Proportional between 4276, and 842?
*Anſ.* 1897,4+.

### *To find the Side of a Square equal in Area to any given Superficies.*

RULE. The Square Root of the Content of any given Superficies, is the Square equal ſought.

### EXAMPLES.

29. If the Content of a given Circle be 160, what is the Side of the Square? *Anſ.* 12,64911.

30. If the Area of a Circle is 750, what is the Side of the Square equal? *Anſ.* 27,38612.

### *The Area of a Circle given to find the Diameter.*

RULE. As 355 : 452, or, as 1 : 1,273239 : : ſo is the Area : to the Square of the Diameter; —or, multiply the Square Root of the Area, by 1, 12837, and the Product will be the Diameter.

### EXAMPLE.

31. What Length of Cord will be fit to tie to a Cow's Tail, the other End fixed in the Ground, to let her have Liberty of eating an Acre of Graſs, and no more, ſuppoſing the Cow and Tail to be 5 Yards ½? *Anſ.* 6, 136 *Perches.*

### *The Area of a Circle given to find the Periphery, or Circumference.*

RULE. As 113 : 1420, or, as 1 : 12,56637 : : the Area to the Square of the Periphery, or multiply the Square Root of the Area by 3,5449, and the Product is the Circumference.

### EXAMPLES.

32. When the Area is 12, what is the Circumference?
*Anſ.* 12, 2798.

33. When the Area is 160, what is the Periphery?
*Anſ.* 44,839.

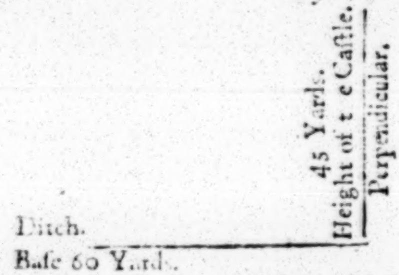
Any two Sides of a right angled Triangle given to find the third Side.

1. *The Baſe and Perpendicular given to find the Hypothenuſe.*

RULE. The Square Root of the Sum of the Squares of the Baſe and Perpendicular is the Length of the Hypothenuſe.

EXAMPLES.

34. The Top of a Caſtle from the Ground is 45 Yards high, and ſurrounded with a Ditch 60 Yards broad, what Length muſt a Ladder be to reach from the Outſide of the Ditch to the Top of the Caſtle? *Anſ.* 75 *Yards.*



35. The Wall of a Town is 25 Feet high, which is ſurrounded by a Moat of 30 Feet in Breadth, I deſire to know the Length of a Ladder that will reach from the Outſide of the Moat to the Top of the Wall? *Anſ.* 39,05 *Feet.*

*The Hypothenuſe and Perpendicular given to find the Baſe.*

RULE. The Square Root of the Difference of the Squares of the Hypothenuſe and Perpendicular is the Length of the Baſe.

*The Baſe and Hypothenuſe given to find the Perpendicular.*

RULE. The Square Root of the Difference of the Squares of the Hypothenuſe and Baſe is the Heighth of the Perpendicular.

N. B. *The two laſt Queſtions may be varied for Examples to the two laſt Propoſitions.*

Any Number of Men being given to form them into a ſquare Battle, or to find the Number of Ranks and Files.

RULE. The Square Root of the Number of Men given is the Number of Men either in Rank or File.

36. An Army conſiſting of 331776 Men, I deſire to know how many in Rank and File? *Anſ.* 576.

37. A certain ſquare Pavement contains 48841 ſquare Stones, all of the ſame Size, I demand how many are contained in one of the Sides? *Anſ.* 221.

EX-

# EXTRACTION *of the* CUBE ROOT.

TO extract the Cube Root is to find out a Number which being multiplied into itſelf, and then into that Product, produceth the given Number.

RULE 1. Point every third Figure of the Cube given, beginning at the Unit's Place, ſeek the greateſt Cube to the firſt Point, and ſubtract it therefrom, put the Root in the Quotient, and bring down the Figures in the next Point to the Remainder for a *Reſolvend.*

2. Find a DIVISOR by multiplying the Square of the Quotient by 3. See how often it is contained in the Reſolvend, rejecting the Units and Tens, and put the Anſwer in the Quotient.

3. To find the SUBTRAHEND. 1. Cube the laſt Figure in the Quotient. 2. Multiply all the Figures in the Quotient by 3, except the laſt, and that Product by the Square of the laſt. 3. Multiply the Diviſor by the laſt Figure. Add theſe Products together, gives the Subtrahend, which ſubtract from the Reſolvend; to the Remainder bring down the next Point, and proceed as before.

| ROOTS. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|---|---|
| CUBES. | 1. | 8. | 27. | 64. | 125. | 216. | 343. | 512. | 729. |

EXAMPLES.

1. What is the Cube Root of 99252847?

99252847(463
64 = *Cube of* 4.
*Diviſor.*
*Square of* 4 × 3 = 48)35252 *Reſolvend.*

216 = *Cube of* 6.
432 = 4 × 3 × *by Square of* 6.
288 = *Diviſor* × *by* 6.

33336 *Subtrahend.*
*Diviſor.*
*Square of* 46 × 3 = 6348)1916847 *Reſolvend.*

27 = *Cube of* 3.
1242 = 46 × 3 × *by Square of* 3.
19044 = *Diviſor* × *by* 3.

1916847 *Subtrahend.*

*Another*

## *Another* NEW *and more* conciſe Method *of extracting the* Cube Root.

RULE 1. Point every third Figure of the Cube given, beginning at the Unit's Place, then find the nigheſt Cube to the firſt Point, and ſubtract it therefrom, put the Root in the Quotient, bring down the Figures in the next Point to the Remainder for a Reſolvend.

2. Square the Quotient and triple the Square for a Diviſor, *As* 4×4×3=48. Find how often it is contained in the Reſolvend, rejecting Units and Tens, and put the Anſwer in the Quotient.

3. Square the laſt Figure in the Quotient, and put it on the Right hand of the Diviſor.
*As* 6×6=36 put to the *Diviſor* 48=4836.

4. Triple the laſt Figure in the Quotient and multiply by the former, put it under the other, Units under the Tens, add them together, and multiply the Sum by the laſt Figure in the Quotient, ſubtract that Product from the Reſolvend, bring down the next Point and proceed as before.

### EXAMPLES.

1. What is the Cube Root of 99252847 ?

*Square of* 4×3=48 *Diviſor.* 99252847(463
*Square of* 6, *put to* 48=4836 64
6×3×4= 72
35252
5556×6= 33336
*Square of* 46=2116×3=6348 *Diviſor*
*Square of* 3=9 *put to* 6348=*634809 1916847
3×3×46=414
638949×3=1916847

2. What is the Cube Root of 389017 ? *Anſ.* 73.
3. What is the Cube Root of 5735339 ? *Anſ.* 179.
4. What is the Cube Root of 32461759 ? *Anſ.* 319.
5. What is the Cube Root of 84604519 ? *Anſ.* 439.
6. What is the Cube Root of 259694072 ? *Anſ.* 638.
7. What is the Cube Root of 48228544 ? *Anſ.* 364.

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* *When the Quotient is* 2 *or* 3 *there muſt be a* Cypher *put to ſupply the Place of Tens.*

8. What is the Cube Root of 27054036008? *Anſ.* 3002.
9. What is the Cube Root of 22069810125? *Anſ.* 2805.
10. What is the Cube Root of 122615327232? *Anſ.* 4968.
11. What is the Cube Root of 219365327791? *Anſ.* 6031.
12. What is the Cube Root of 673373097125? *Anſ.* 8765.

1. *When the given Number conſiſts of a whole Number and Decimal together, make the Number of Decimals to conſiſt of 3, 6, 9, &c. Places by adding Cyphers thereto, ſo that there may be a Point fall on the Unit's Place of the whole Number.*

13. What is the Cube Root of 12,977875? – *Anſ.* 2,35
14. What is the Cube Root of 36155,027576? *Anſ.* 33,06+
15. What is the Cube Root of ,001906624? – *Anſ.* ,124
16. What is the Cube Root of 33,230979637? *Anſ.* 3,215+
17. What is the Cube Root of 15926,972504? *Anſ.* 25,16+
18. What is the Cube Root of ,053258279? – *Anſ.* ,376

*To extract the Cube Root of a Vulgar Fractions.*

RULE. Reduce the Fraction to its loweſt Terms, then extract the Cube Root of the Numerator and Denominator for a new Numerator and Denominator, but if the Fraction be a Surd, reduce it to a Decimal, and then extract the Root from it.

### EXAMPLES.

19. What is the Cube Root of $\frac{250}{686}$? *Anſ.* $\frac{5}{7}$.
20. What is the Cube Root of $\frac{324}{1500}$? *Anſ.* $\frac{3}{5}$.
21. What is the Cube Root of $\frac{1620}{5430}$? *Anſ.* $\frac{2}{3}$.

### SURDS.

22. What is the Cube Root of $\frac{4}{7}$? *Anſ.* ,829+
23. What is the Cube Root of $\frac{5}{9}$? *Anſ.* ,822+
24. What is the Cube Root of $\frac{2}{3}$? *Anſ.* ,873+

*To extract the Cube Root of a mixt Number.*

RULE. Reduce the Fractional Part to its loweſt Terms, and then the mixt Number to an improper Fraction, extract the Cube Roots of the Numerator and Denominator for a new Numerator and Denominator; but if the mixt Number given be a Surd, reduce the fractional Part to a Decimal, annex it to the whole Number, and extract the Root therefrom.

EXAM-

## EXAMPLES.

25. What is the Cube Root of 12 $\frac{19}{27}$? *Anſ.* 2 $\frac{1}{3}$.
26. What is the Cube Root of 31 $\frac{15}{343}$? *Anſ.* 3 $\frac{1}{7}$.
27. What is the Cube Root of 405 $\frac{2}{125}$? *Anſ.* 7 $\frac{2}{5}$.

## SURDS.

28. What is the Cube Root of 7 $\frac{1}{5}$? *Anſ.* 1,93+
29, What is the Cube Root of 9 $\frac{1}{7}$? *Anſ.* ,2092+
30. What is the Cube Root of 8 $\frac{5}{7}$? *Anſ.* 2,057+

## *The* APPLICATION.

1. If a cubical Piece of Timber be 47 Inches long, 47 Inches broad, and 47 Inches deep, how many cubical Inches doth it contain: *Anſ.* 103823.

2. There is a Cellar dug, that is 12 Feet every Way in Length, Breadth, and Depth, how many ſolid Feet of Earth was taken out of it? *Anſ.* 1728.

3. There is a Stone of a Cubic Form, which contains 389017 ſolid Feet, what is the ſuperficial Content of one of its Sides? *Anſ.* 5329.

### *Between two Numbers given, to find two mean Proportionals.*

RULE. Divide the greater Extream by the leſſer, and the Cube Root of the Quotient multiplied by the leſſer Extream, gives the leſſer Mean; multiply the ſaid Cube Root by the leſſer Mean, and the Product will be the greater Mean proportional.

## EXAMPLES

4. What are the two mean Proportionals between 6 and 162? *Anſ.* 18 *and* 54.

5. What are the two mean Proportionals between 4 and 108? *Anſ.* 12 *and* 36.

### *To find the Side of a Cube that ſhall be equal in Solidity to any given Solid, as a Globe, Cylinder, Priſm, Cone, &c.*

RULE. The Cube Root of the ſolid Content of any ſolid Body given, is the Side of the Cube of equal Solidity.

## EXAMPLE.

6. If the ſolid Content of a Globe is 10648, what is the Side of a Cube of equal Solidity. *Anſ.* 22.

*The Side of the Cube being given, to find the Side of the Cube, that ſhall be double, treble, &c. in Quantity to the Cube given.*

RULE. Cube the Side given, and multiply it by 2, 3, &c. the Cube Root of the Product is the Side ſought.

### EXAMPLE.

7. There is a cubical Veſſel, whoſe Side is 12 Inches, and it is required to find the Side of another Veſſel, that is to contain 3 Times as much? *Anſ.* 17,306.

## EXTRACTION *of the* BIQUADRATE ROOT.

TO extract the Biquadrate Root, is to find out a Number, which being involved four Times into itſelf will produce the given Number.

RULE. Firſt extract the Square Root of the given Number, and then extract the Square Root of that Square Root, and it will give the Biquadrate Root required.

### EXAMPLES.

1. What is the Biquadrate of 27? – – *Anſ.* 531441.
2. What is the Biquadrate of 76? – – *Anſ.* 33362176.
3. What is the Biquadrate of 275? – – *Anſ.* 5719140625.
4. What is the Biquadrate Root of 531441? – – *Anſ.* 27.
5. What is the Biquadrate Root of 33362176? – *Anſ.* 76.
6. What is the Biquadrate Root of 5719140625? *Anſ.* 275.

## *A general* RULE *for* EXTRACTING *the* ROOTS *of all* POWERS,

1. PREPARE the Number given for Extraction, by pointing off from the Units Place, as the Root required directs.

2. Find the firſt Figure in the Root; by the Table of Powers, which ſubtract from the given Number.

3. Bring down the firſt Figure in the next Point to the Remainder, and call it the Dividend.

4. Involve the Root into the next inferior Power to that which is given, multiply it by the given Power, and call it the Diviſor.

5. Find a Quotient Figure by common Division, and annex it to the Root, then involve the whole Root into the given Power and call that the Subtrahend.

6. Subtract *that Number* from as many Points of the given Power as is brought down, beginning at the lowest Place, and to the Remainder bring down the first Figure of the next Point for a new Dividend.

7. Find a new Divisor, and proceed in all Respects as before.

### EXAMPLES.

1. What is the Square Root of 141376?

141376(376
9

6)51 *Dividend*

1369 *Subtrahend*

74) 447 *Dividend*

141376 *Subtrahend*

3 × 2 = 6 *Divisor.*
37 × 37 = 1369 *Subtrahend.*
37 × 2 = 74 *Divisor.*
376 × 376 = 141376 *Subtrahend.*

2. What is the Cube Root of 53157376?

53157376(376
27

27)261 *Dividend*

50653 *Subtrahend*

4107)25043 *Dividend*

53157376 *Subtrahend*

3 × 3 × 3 = 27 *Divisor*
37 × 37 × 37 = 50653 *Subtrahend*
37 × 37 × 3 = 4107 *Divisor*
376 × 376 × 376 = 53157376 *Subtrahend.*

3. What is the Biquadrate Root of 19987173376?

19987173376(376
81

108)1188 *Dividend*

1874161 *Subtrahend*

202612)1245563 *Dividend*

19987173376 *Subtrahend*

3 × 3 × 3 × 4 = 108 *Diviſor*
37 × 37 × 37 × 37 = 1874161 *Subtrahend*
37 × 37 × 37 × 4 = 202612 *Diviſor*
376 × 376 × 376 × 376 = 19987173376 *Subtrahend*

## SIMPLE INTEREST.

THERE are five Letters to be obſerved in Simple Intereſt, *viz.*

P. the Principal.
T. the Time.
R. the Ratio, or Rate *per Cent.*
I. the Intereſt.
A. the Amount.

## *A* TABLE *of* RATIOS.

| | | | | | |
|---|---|---|---|---|---|
| 3 | ,03 | 5½ | ,055 | 8 | ,08 |
| 3½ | ,035 | 6 | ,06 | 8½ | ,085 |
| 4 | ,04 | 6½ | ,065 | 9 | ,09 |
| 4½ | .045 | 7 | ,07 | 9½ | ,09 |
| 5 | ,05 | 7½ | ,075 | 10 | ,1 |

Note, *The* Ratio *is the Simple Intereſt of* £1. *for one Year, at the* Rate per Cent. *propoſed, and is found thus:*

£. £. £.
*As* 100 : 3 :: 1 : ,03 *As* 100 : 3,5 :: 1 : ,035.

### *When the Principal, Time and Rate* per Cent. *are given to find the Intereſt.*

Rule. Multiply the Principal, Time and Rate together, and it will give the Intereſt required.

Note, *The Propoſition and Rule are better expreſſed thus:*

When $P$, $T$, and $R$ are given to ſind $I$.

Rule. $prt=I$.

Note, *When two or more Letters are put together like a Word, they are to be multiplied one into another.*

### Example.

1. What is the Intereſt of £945..10..–. for 3 Years, at 5 *per Cent. per Annum?*

*Anſ.* £945,5 × ,05 × 3 = 141 ,825 *or* £141..16..6.

2. What is the Intereſt of £547..14. –. at 4 *per Cent. per Annum*, for 6 Years? *Anſ.* £131..8..11. 2 *qr.* ,08.

3. What is the Intereſt of £796..15..–. at 4 ½ *per Cent. per Annum* for 5 Years? *Anſ.* £179..5..4. 2 *qr.*

4. What is the Intereſt of £397..9..5. for 2 Years and ½, at 3 ½ *per Cent. per Annum?* *Anſ.* £34..15..6. 3,5499 *qrs.*

5. What is the Intereſt of £554..17..6. for 3 Years, 8 Months, at 4 ½ *per Cent. per Annum?* *Anſ.* £91..11..1.

6. What is the Intereſt of £236..18..8. for 3 Years 8 Months at 5 ½ *per Cent. per Annum?* *Anſ.* £47..15..7. 1,4528 *qrs.*

### *When the Intereſt is for any Number of Days only.*

Rule. Multiply the Intereſt of £1. for one Day, at the given Rate, by the Principal and Number of Days, it will give the Anſwer.

## INTEREST *of* £. 1 *for* 1 DAY.

| *er Cent.* | *Decimals.* | *per Cent.* | *Decimals.* |
|---|---|---|---|
| 3 | ,00008219178 | 6½ | ,00017808219 |
| 3½ | ,00009589041 | 7 | ,00019178082 |
| 4 | ,00010958904 | 7½ | ,00020547954 |
| 4½ | ,00012328767 | 8 | ,00021917808 |
| 5 | ,00013698630 | 8½ | ,00023287671 |
| 5½ | ,00015068493 | 9 | ,00024657534 |
| 6 | ,00016438356 | 9½ | ,00026027397 |

Note, *The above Table is thus found.*

*As* 365 : ,03 :: 1 : ,00008219178. *And as* 365 : ,035 : : 1 : ,00009589041, *&c.*

Exam-

### EXAMPLES.

1. What is the Intereſt of £240. for 120 Days, at 4 *per Cent. per Ann?* *Anſ.* ,0001095890 4 × 240 × 120 = £3 .. 3 . 1$\frac{1}{4}$.

2. What is the Intereſt of £563. at 6 *per Cent. per Annum*, for 125 Days? *Anſ.* £11..13..2$\frac{1}{2}$.

3. What is the Intereſt of £560. for 60 Days, at 5 *per Cent. per Annum?* *Anſ.* £4..12..–$\frac{1}{2}$.

4. What is the Intereſt of £364..13..–. for 154 Days, at 5 *per Cent. per Annum?* *Anſ.* £7..13 .11$\frac{1}{4}$.

5. What is the Intereſt of £725..15..–. for 74 Days, at 4 *per Cent. per Annum?* *Anſ.* £5..17..8$\frac{1}{2}$.

6. What is the Intereſt of £100 from the 1ſt of *June*, 1755. to the 9th of *March* following, at 5 *per Cent. per Annum.* *Anſ.* £3..17. 3.

2. *When* P, R, T *are given to find* A.

RULE. $prt + p = a$

### EXAMPLES.

1. What will £279..12..–. amount to in 7 Years, at 4$\frac{1}{2}$. *per Cent. per Annum?* *Anſ.* £367 .. 13..5, 3.04 *qrs.* 279,6 × ×,045 × 7 + 279,6 = 367,674.

2. What will £320..17..–. amount to in 5 Years, at 3$\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* 376..19..11 2, 8 *qrs.*

3 What will £679..13..–. amount to in 6 Years, at 5 *per Cent. per Annum?* *Anſ.* £883..10..10 3, 2 *qrs.*

*When there is any odd Time given with the whole Years, reduce the odd Time into Days, and work with the Decimal Parts of a Year which are equal to thoſe Days.*

What will £926..12..–. amount to in 5 Years $\frac{1}{2}$, at 4 *per Cent. per Annum?* *Anſ.* £1130..9..–. 1 ,92 *qrs.*

5. What will 368..16..–. amount to in 7 Years $\frac{3}{4}$. at 6$\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £554..11..7 . 3,68 *qrs.*

6. What will £273..18..–. amount to in 4 Years, 175 Days, at 3 *per Cent. per Annum?*

*Anſ.* £310..14. 1. ,35080064 *qrs.*

I. *When* A, R, T *are given to find* P.

RULE. $\dfrac{a}{rt+1} = p$.

## EXAMPLES.

1. What Principal being put to intereſt, will amount to £367..13..5. 3,04 *qrs.* in 7 Years, at $4\frac{1}{2}$ *per Cent. per Annum?*
*Anſ.* ,045 × 7 × 1 = 1,315, *then* 367,674 ÷ 1,315 = £279..12..–.

2. What Principal being put to Intereſt, will amount to £376..19.,11. 2,8 in 5 Years, at $3\frac{1}{2}$ *per Cent. per Annum?*
*Anſ.* £320..17..–.

3. What Principal being put to Intereſt will amount to £883..10..10. 3,2 *qrs.* in 6 Years, at 5 *per Cent. per Annum?*
*Anſ.* £679..13..–.

4. What Principal being put to Intereſt, will amount to £1130..9..–. 1,92 *qrs.* in 5 Years, $\frac{1}{2}$ at 4 *per Cent. per Annum?*
*Anſ.* £926..12..–.

5. What Principal will amount to £554..11..7..3,68 *qrs.* in 7 Years $\frac{3}{4}$, at $6\frac{1}{2}$ *per Cent. per Annum? Anſ.* £368..16..–.

6. What Principal will amount to £310..14..1. 3,35080064 *qrs.* in 4 Years, 175 Days, at 3 *per Cent. per Annum.*
*Anſ.* £273..18..–.

IV. *When* A. P, T *are given to find* R.

**RULE.** $$\frac{a-p}{pt} = R.$$

## EXAMPLES.

1. At what Rate *per Cent.* will £279..12..–. amount to £367..13..5. 3,04 *qrs.* in 7 Years?
*Anſ.* 367,674 — 279,6 = 88,074. 279,6 × 7 = 1957,2 *then* £88,074 ÷ 1957,2 = ,045 *or* $4\frac{1}{2}$ *per Cent.*

2. At what Rate *per Cent.* will £320..17..–. amount to £376..19..11. 2,8 *qrs.* in 5 Years? *Anſ.* $3\frac{1}{2}$ *per Cent.*

3. At what Rate *per Cent.* will £679..13..–. amount to £883..10..10..3,2 *qr.* in 6 Years? *Anſ.* 5 *per Cent.*

4. At what Rate *per Cent.* will £926..12..–. amount to £1130..9..–. 1,92 *qrs.* in 5 Years $\frac{1}{2}$? *Anſ.* 4 *per Cent.*

5. At what Rate *per Cent.* will £368..16..–. amount to £554..11..7..3,68 *qrs.* in 7 Years $\frac{3}{4}$? *Anſ.* $6\frac{1}{2}$ *per Cent.*

6. At what Rate *per Cent.* will £273..18..–. amount to £310..14..1. 3,35080064 *qrs.* in 4 Years. 175 Days?
*Anſ.* 3 *per Cent.*

V. *When* A, P, R *are given to find* T.

**RULE,** $$\frac{a-p}{pr} = T.$$

1. In what Time will £279..12..–. amount to £367..13..5 3,01 *qrs.* at 4 ½ *per Cent?* *Anſ.* 367,674—279,6=88,074. 279,6×,045=12,5820 *then* 88,074÷12,5820= 7 *Years.*

2 In what Time will £320..17..–. amount to £376..19..11 2,8 *qrs.* at 3 ½ *per Cent?* *Anſ.* 5 *Years.*

3. In what Time will £679..13..–. amount to £883.10.10 3.2 *qrs.* at 5 *per Cent. per Annum?* *Anſ* 6 *Years.*

4. In what Time will £926..12..–. amount to £1130..9..– 1,92 *qrs.* at 4 *per Cent. per Annum?* *Anſ.* 5 *Years* ½

5. In what Time will 368..16 .–. amount to £554..11..7 3,68 *qrs.* at 6 ½ *per Cent?* *Anſ.* 7 *Years* ¾.

6 In what Time will 273..18..–. amount to £310..14. 1 3,3508064 *qrs.* at 3 *per Cent?* *Anſ.* 4 *Years,* 175 *Days.*

## Annuities, *or* Penſions, *&c. in* Arrears.

Annuities, or Penſions, *&c.* are ſaid to be in Arrears, when they are payable or due, either yearly, half yearly, or quarterly, and are unpaid for any Number of Payments.

NOTE, U *repreſents the* Annuity, Penſion, *or* yearly Rent, T, R, A, *as before.*

*When* U, R, T *are given to find* A.

RULE. $\frac{ttu-tu.}{2}\times r:+tu=A$

### EXAMPLES.

1. If a Salary of £150. be forborne 5 Years, at 5 *per Cent.* what would it amount to? *Anſ.* £825.

$\overline{5\times5\times150}-\overline{5\times150}=3000.$ *then* $\frac{3000}{2}\times,05+5\times150=$£825

2. If £250. yearly Penſion be forborne 7 Years, what will it amount to in that Time, at 6 *per Cent?* *Anſ.* £2065.

3. There is a Houſe let upon Leaſe for 5 Years ½. at £60. *per Annum* what will be the amount of the whole Time, at 4 ½ *per Cent?* *Anſ.* £363..8..3.

4. Suppoſe an annual Penſion of £28 remains unpaid for 8 Years, what would it amount to at 5 *per Cent?*

*Anſ.* £263..4..–.

Note, *When the Annuities,* &c. *are to be paid half yearly, or quarterly, then*

*For* half yearly Payments, *take Half of the Ratio, Half of the Annuity,* &c. *and twice the Number of Years,—and,*

*For* Quarterly Payments, *take a fourth Part of the Ratio, a fourth Part of the Annuity,* &c. *and four Times the Number of Years, and work as before.*

## EXAMPLES.

5. If a Salary of £150. payable every half Year, remains unpaid for 5 Years, what would it amount to in that Time, at 5 *per Cent. per Annum?* *Anſ.* £834..7..6.

6. If a Salary of £150. payable every Quarter, was left unpaid for 5 Years, what would it amount to in that Time, at 5 *per Cent?* *Anſ.* £839..1..3

Note, *It may be obſerved, by comparing theſe laſt Examples, that the Amount of the half yearly Payments are more advantageous than the yearly, and the quarterly more than the half yearly.*

II. *When* A, R, T *are given to find* U.

$$\text{RULE.}\ \frac{2a}{ttr - tr + 2t} = \text{U}.$$

## EXAMPLES.

1. If a Salary amounted to £825. in 5 Years, at 5 *per Cent.* what was the Salary? *Anſ.* £150.

$825 \times 2 = 1650 \quad \overline{5 \times 5 \times ,05 - 5 \times .05 + 5 \times 2} = 11$ *then* $1650 \div 11 =$ £150.

2. If an Houſe to be let upon Leaſe for 5 Years $\frac{1}{2}$, and the Amount for that Time be £363..8..3. at 4 $\frac{1}{2}$ *per Cent.* what is the yearly Rent? *Anſ* £60.

3. If a Penſion amounted to £2065. in 7 Years at 6 *per Cent.* what was the Penſion? *Anſ.* £250.

4: Suppoſe the Amount of a Penſion be £263..4..–. in 8 Years at 5 *per Cent.* what is the Penſion? *Anſ.* £28.

Note, *When the Payments are half yearly, then take* 4*a and half of the Ratio, and twice the Number of Years, and if quarterly, then take* 8*a, one fourth of the Ratio, and four Times the Number of Years, and proceed as before.*

5. If the amount of a Salary payable half yearly for 5 Years, and at 5 *per Cent.* be £834..7..6. what is the Salary? *Anſ.* 150

6. If the Amount of an Annuity payable quarterly be £839..1..3. for 5 Years, at 5 *per Cent.* what is the Annuity? *Anſ* £150.

III. *When* U, A, T *are given to find* R.

RULE. $\frac{2a-2ut}{utt-ut}=R$

## EXAMPLES.

If a Salary of £150. *per Annum*, amounts to £825. in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

$$\overline{825\times2}-\overline{150\times5\times2}=150 \text{ then } \frac{150}{\overline{150\times5\times5}-\overline{150\times5}}=,05$$

2. If an Houſe be let upon Leaſe for 5 Years $\frac{1}{2}$ at £60. *per Annum*, and the Amount for that Time be £363..8..3. what is the Rate *per Cent?* *Anſ.* 4 $\frac{1}{2}$ *per Cent.*

3. If a Penſion of £250. *per Annum*, amounts to £2065. in 7 Years, what is the Rate *per Cent?* *Anſ.* 6 *per Cent.*

4. Suppoſe the Amount of an yearly Penſion of £28. be £263..–4..–. in 8 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

Note, *When the Payments are half yearly, take* 4a—4ut *for a Dividend, and work with half the Annuity, and double the Number of Years for a Diviſor; if quarterly, take* 8a—8ut *and work with a Fourth of the Annuity, and four Times the Number of Years.*

5. If a Salary of £150 *per Annum*, payable half yearly, amounts to £834..7..6. in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

6. If an Annuity of £150 *per Annum*, payable quarterly, amounts to £839..1..3. in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

IV. *When* U, A, R *are given to find* T.

RULE. *Firſt* $\overline{\frac{2}{r}-1}=x$ *then* $\surd\overline{\frac{2a}{ur}+\frac{xx}{4}}:-\frac{x}{2}=T;$

## EXAMPLES.

1. In what Time will a Salary of £150 *per Annum*, amount to £825 at 5 *per Cent?* *Anſ.* 5 *Years.*

$$\frac{2}{,05} - 1 = 39\ \frac{82\ \times 2}{150 \times ,05} = 220\ \frac{39 \times 39}{4} = 380,25$$

$$\sqrt{220 + 380,25} = 24,5 - \frac{39}{2} = 5 \text{ Years.}$$

2. If an Houſe is let upon Leaſe for a certain Time for £60 *per Annum*, and the Amount be £363..8..3. at 4 ½ *per Cent*. I deſire to know the Time it was let for?
*Anſ.* 5 ½ *Years.*

3. If a Penſion of £250 *per Annum* being forborne a certain Time, amounts to £2065 at 6 *per Cent*. what was the Time of Forbearance? *Anſ* 7 *Years.*

4. In what Time will a yearly Penſion of £28 amount to £263..4..–. at 5 *per Cent*? *Anſ.* 8 *Years*

Note, *If the Payments are half yearly, take half the Ratio, and half the Annuity, if quarterly, one fourth of the Ratio, and one fourth of the Annuity, and* Y *will be equal to thoſe half-yearly or quarterly* Payments.

5. If an Annuity of £150 *per Annum*, payable half-yearly? amounts to £834..7..6. at 5 *per Cent*. what Time was the Payment forborne? *Anſ.* 5 *Years.*

6. If an yearly Penſion of £150 payable quarterly, amounts to £839..1..3. at 5 *per Cent*. what was the Time of Forbearance? *Anſ.* 5 *Years.*

### Preſent Worth of ANNUITIES.

Note, P *repreſents the preſent Worth*; U, T, R *as before.*

I. *When* U, T, R *are given to find* P.

$$\text{RULE. } \frac{ttr - tr + 2t.}{2tr + 2} : \times u = P.$$

### EXAMPLES.

1. What is the preſent Worth of £150 *per Annum*, to continue 5 Years, at 5 *per Cent*. *Anſ.* £660.

$\overline{5 \times 5 \times ,05 - 5 \times ,05 + 5 \times 2} = 11.5\ \overline{\times ,05 \times 2 + 2} = 2,5$ *then* 11 ÷ 2.5 × 150 = £660.

2. What is the yearly Rent of a Houſe of £60. to continue 5 ½ Years worth in ready Money, at 4 ½ *per Cent*.
*Anſ.* £29..6..3.

3. What is the preſent Worth of £250 *per Annum*, to continue 7 Years at 6 *per Cent*. *Anſ.* £1454..4..6.

4. What is a Penſion of £28. *per Annum* worth in ready Money, at 5 *per Cent*. for 8 Years? *Anſ.* £188.

Note, *The ſame Thing is to be obſerved here as in the firſt Rule of Annuities in Arrears, concerning half-yearly and quarterly Payments.*

5. What is the preſent Worth of £150. payable half-yearly for 5 Years, at 5 *per Cent.* *Anſ.* £667..10..–.

6. What is the preſent Worth of £150. payable quarterly for 5 Years, at 5 *per Cent.* *Anſ.* £671..5..–.

Note, *By comparing the laſt Examples it will be found that the preſent Worth of half-yearly Payments is more advantageous than yearly; and quarterly, than half-yearly.*

II. *When* P, T, R *are given to find* U.

RULE. $\frac{tr+1}{ttr-tr+2t}:\times 2p=U.$

EXAMPLES.

1. If the preſent Worth of a Salary be £660. to continue 5 Years at 5 *per Cent.* what was the Salary? *Anſ.* £150.

$$\overline{5\times,05}+1=1.25.\ \ \overline{5\times5\times,05}-\overline{5\times,05}+10=11$$

$$\textit{then}\ \frac{1,25}{11}\times660\times2=150.$$

2. There is an Houſe let upon Leaſe for 5 ½ Years to come, I deſire to know the yearly Rent, when the preſent Worth at 4 ½ *per Cent.* is £291..6..3? *Anſ.* £60.

3. What Annuity is that which for 7 Years Continuance at 6 *per Cent.* produce £1454..4..6, preſent Worth? *Anſ.* £250.

4. What Annuity is that which for 8 Years Continuance produces £188. for the preſent Worth, at 5 *per Cent.* *Anſ.* £28.

Note, *When the Payments are half-yearly, take Half the Ratio, twice the Number of Years and multiply by* 4p, *and when quarterly take one fourth of the Ratio, four Times the Number of Years, and multiply by* 8p.

5. There is an Annuity payable half-yearly, for 5 Years to come, what is the yearly Rent, when the preſent Worth at 5 *per Cent.* is £667..10..–? *Anſ.* £150.

6. There is an Annuity payable quarterly, for 5 Years to come, I deſire to know the yearly Income, when the preſent Worth at 5 *per Cent.* is £671..5..–? *Anſ.* £150.

III. *When* U, P, T *are given to find* R.

RULE. $\frac{\overline{ut-p}\times2}{2pt+ut-utt}=R.$

### EXAMPLES.

1. At what Rate *per Cent.* will an Annuity of £150 *per Annum*, to continue 5 Years, produce the preſent worth of £660 ? *Anſ.* 5 *per Cent.*

$\overline{150\times5}-660\times2=180.\ \overline{2\times660\times5}+\overline{1\ 0\times5}-\overline{150\times5\times5}$
$=3600$ *then* $180\div3600=,05=5$ *per Cent.*

2. If an yearly Rent of £60. *per Annum* to continue $5\frac{1}{2}$ Years, produce £291..6..3. for the preſent Worth, what is the Rate *per Cent.* *Anſ.* $4\frac{1}{2}$ *per Cent.*

3. If an Annuity of £250 *per Annum*, to continue 7 Years, produce £1454..4..6. for the preſent Worth, what is the Rate *per cent.* *Anſ.* 6 *per cent.*

4. If a Penſion of £28 *per Annum*, to continue 8 Years, produce £188 for the preſent Worth, what is the Rate *per Cent.* *Anſ.* 5 *per cent.*

Note, *When the Annuities or Rents*, &c. *are to be paid half-yearly, or quarterly, then*

*For* half-yearly Payments, *take half of the Annuity*, &c. *and twice the Number of Years, the Quotient will be the Ratio of a fourth Part of the Rate per cent and*

*For* quarterly Payments, *take a fourth Part of the Annuity*, &c. *and four Times the Number of Years, the Quotient will be the Ratio of a fourth Part of the Rate per cent.*

5. An Annuity of £150 *per Annum*, payable half-yearly, having 5 Years to come, is ſold for £667..10..–. what is the Rate *per cent.* *Anſ.* 5 *per cent.*

6. If an Annuity of £150 *per Annum*, payable quarterly, having 5 Years to come, is ſold for £671 .5..–. what is the Rate *per cent.* *Anſ.* 5 *per cent.*

IV. *When* U, P, R *are given to find* T.

RULE. $\overline{\frac{2}{r}-\frac{2p}{u}}-1=x$ *then* $\sqrt{\overline{\frac{2p}{ur}+\frac{xx}{4}}}-\frac{x}{2}=T$

### EXAMPLES.

1. If an Annuity of £150 *per Annum*, produce £660 for the preſent Worth, at 5 *per cent.* what is the Time of its Continuance ? *Anſ.* 5 *Years.*

$$\frac{2}{,05} - \frac{660\times 2}{150} - 1 = 30{,}2 \qquad \frac{660{,}\times 2}{150\times {,}05} = 176$$

$$\frac{30{,}2\times 30{,}2}{4} = 228{,}01,\ \textit{then}\ \sqrt{228{,}01{,}+176} = 20{,}1$$

$$\frac{20{,}1 - 30{,}2}{2} = 5\ \text{Years}$$

2. For what Time may a Salary of £60 be purchaſed for £291..6..3. at 4 ½ *per cent.* *Anſ.* 5 ½ *Years.*

3. For how long Time may £250 *per Annum*, be purchaſed for £1454..4..6. at 6 *per cent.* *Anſ.* 7 *Years.*

4. What Time may a Penſion of £28 *per Annum* be bought for £188 at 5 *per cent.* *Anſ.* 8 *Years.*

Note, *When the Payments are half yearly, then* U *will be equal to Half the Annuity,* &c. R, *Half the Ratio, and* T *the Number of Payments, and*

*When the Payments are quarterly,* U *will be equal to a fourth Part of the Annuity,* &c. R, *the fourth of the Ratio, and* T *the Number of Payments.*

5. If an Annuity of £150 *per Annum*, payable half-yearly, is ſold for £667. 10..–. at 5 *per cent.* I deſire to know the Number of Payments, and the Time to come?

*Anſ.* 10 *Payments,* 5 *Years.*

6. An Annuity of £150 *per Annum,* payable quarterly, is ſold for £671 .5..–. at 5 *per cent.* what is the Number of Payments and Time to come? *Anſ.* 20 *Payments,* 5 *Years.*

## ANNUITIES, *&c. taken in* REVERSION.

1. *To find the preſent Worth of Annuity,* &c. *taken in Reverſion.*

RULE. Find the preſent Worth of the yearly Sum at the given Rate, and for the Time of its Continuance, *thus,*

$$\frac{ttr - tr + 2t}{2tt + 2} : \times a = P.$$

2. Change *P*, into *A*, and find what Principal being put to Intereſt will amount to *A*, at the ſame Rate, and for the Time to come before the Annuity, &c. commences, thus,'

$$\frac{a}{tr + 1} = P.$$

## EXAMPLES.

1. What is the preſent worth of an Annuity of £150 *per Annum*, to continue 5 Years, but not to commence till the End of 4 Years allowing 5 *per Cent* to the Purchaſer?

*Anſ.* £550

$$\frac{\overline{\overline{5\times5\times,05-5\times,05}+\overline{2\times5}}}{5\times05\times2+2}=4,4+150=\frac{660}{4\times,05+1}=550$$

2. What is the preſent Worth of a Leaſe of £50 *per Annum*, to continue 4 Years but is not to commence till the End of 5 Years, allowing 4 *per Cent* to the Purchaſer?

*Anſ.* £152..5..11, 3 *qrs.*

3. A Perſon having the Promiſe of a Penſion of £20 *per Annum*, for 8 Years, but is not to commence till the End of 4 Years, is willing to diſpoſe of the ſame for preſent Money at 5 *per Cent*. what will be the preſent Worth?

*Anſ.* £111..18..1. 14+*d.*

4. A Legacy of £40 being left for 6 Years to a Perſon of 15 Years of Age, but is not to commence till he is 21. He wanting Money, is deſirous of ſelling the ſame at 4 *per Cent*. what is the preſent Worth? *Anſ.* 171..14..–.

II. *To find the yearly Income of an Annuity*, &c. *in Reverſion.*

RULE. 1. Find the Amount of the preſent Worth at the given Rate, and for the Time before the Reverſion, *thus*,

$$ptr+p=A$$

2. Change *A.* into *P*, and find what Annuity being ſold will produce *P*, at the ſame Rate, and for the Time of its Continuance, *thus*,

$$\frac{tr+1}{ttr-tr+2t}:\times2p=U.$$

## EXAMPLES.

1. A Perſon having an Annuity left him for 5 Years, which does not commence till the End of 4 Years, has diſpoſed of it for the preſent Payment of £550 allowing 5 *per Cent.* to the Purchaſer, what was the yearly Income. *Anſ.* £150.

$$550\times4\times,05+550=660\,\frac{\overline{5\times,05+1}}{\overline{5\times5\times,05}-\overline{5\times,05}+\overline{5\times2}}$$
$$=113630\times660\times2=£150.$$

2. There is a Leaſe of an Houſe taken for 4 Years, but not to commence till the End of 5 Years, the Leſſee would ſell the ſame for £152..6.–. preſent Payment, allowing 4 *per Cent.* to the Purchaſer, what is the yearly Rent? *Anſ.* £50.

3. A Perſon having the Promiſe of a Penſion for 8 Years, which does not commence till the End of 4 Years, has diſpoſed of the ſame for £111..18..1 .14 preſent Money, allowing 5 *per Cent.* to the Purchaſer, what was the Penſion? *Anſ.* £20.

4. There is a certain Legacy left to a Perſon of 15 Years of Age, which is to be continued for 6 Years, but not to commence till he arrives to the Age of 21; he wanting a Sum of Money, ſells it for £171. 14.–. allowing 4 *per Cent.* to the Buyer, what was the Annuity left him? *Anſ.* £40.

## REBATE or DISCOUNT.

Note, S *Repreſents the Sum to be diſcounted.*
P *the preſent Worth,*
T *the Time.*
R *the Ratio.*

*When* S, T, R *are given to find* P.

RULE. $\frac{s}{tr+1}=P.$

### EXAMPLES.

1. What is the preſent Worth of £357..10..–. to be paid 9 Months hence, at 5 *per Cent?* *Anſ.* £344..11..6..3,168 *qrs.*

$$\frac{357{,}5}{{,}75\times{,}05+1}=344{,}5783$$

2. What is the preſent Worth of £275..10..–. due 7 Months hence, at 5 *per Cent?* *Anſ.* £267..13..10. 26.

3. What is the preſent worth of £875..5..6 due 5 Months hence, at 4½ *per Cent?* *Anſ.* £859..3..3..3. 2544+ *qrs.*

4. How much ready Money can I receive for a Note of £75. due 15 Months hence, at 5 *per Cent?* *Anſ.* £70..11.9.,1752.

II. *When* P, T, R, *are given to find* S.

RULE. $ptr + p = S$.

## EXAMPLES.

1. If the preſent Worth of a Sum of Money due 9 Months hence, allowing 5 *per Cent.* to be £344..11..6. 3,168 *qrs.* what was the Sum firſt due ? *Anſ.* £357..10–.

$$344{,}5783 \times ,75 \times ,05 + 344{,}5783 = £357..10.$$

2. A Perſon owing a certain Sum payable 7 Months hence agrees with the Creditor to pay him down £267..13..10,26 allowing 5 *per Cent.* for preſent Payment, what is the Debt ? *Anſ* £275. 10–.

3 A Perſon receives £859..3..3. ,3,2544 *qrs.* for a Sum of Money due 5 Months hence, allowing the Debtor 4½ *per Cent.* for preſent Payment, what was the Sum due ? *Anſ.* £875. 5..6.

4. A Perſon paid £70..11. 9. ,1752 for a Debt due 15 Months hence he being allowed 5 *per Cent*, for the Diſcount. how much was the Debt ? *Anſ.* £75.

III. *When* S, P, T *are given to find* R.

RULE. $\frac{s-p}{tp} = R$.

## EXAMPLES.

1. At what Rate *per Cent.* will £357..10..–. payable 9 Months hence, produce £344..11..6. 3,168 *qrs.* for preſent Payment ?

$$\frac{357{,}5 - 344{,}5783}{344{,}5783 \times ,75} = ,05 = 5 \text{ per Cent.}$$

2 At what Rate *per Cent.* will £275..10. –. payable 7 Months hence, produce £267..13..10. ,26 for preſent Payment ? *Anſ.* 5 *per Cent.*

3. At what Rate *per Cent.* will £875..5..–. payable 5 Months hence, produce the preſent Payment of £859..3..3 3,2544 *qrs* ? *Anſ.* 4½ *per Cent.*

4. At what Rate *per Cent* will £75. payable 15 Months hence, produce the preſent Payment of £70..11..9. ,1752 ? *Anſ.* 5 *per Cent*,

IV. *When* S, P, R *are given to find* T.

**RULE.** $\frac{s-p}{rp}=T$

## EXAMPLES.

1. The preſent worth of £357..10.–. due for a certain Time to come, is £344..11. 6. 3,168 *qrs.* at 5 *per Cent.* in what Time ſhould the Sum have been paid without any Rebate?

*Anſ.* $\frac{357,5-344,5783}{344,5783\times,05}=,75=9$ *Months*

2. The preſent Worth of £275..10.–. due for a certain Time to come, is £267..13..10. ,26 at 5 *per Cent.* what Time ſhould the Sum have been paid without any Rebate?
*Anſ.* 7 *Months.*

3. A Perſon receives £859..3..3. 3,2544 *qrs.* for £875. 5.–. due at a certain Time to come, allowing 4½ *per Cent.* Diſcount; I deſire to know in what Time the Debt ſhould have been diſcharged without any Rebate?
*Anſ.* 5 *Months.*

4. I have received £70..11..9. ,1752 for a Debt of £75. allowing the Perſon 5 *per Cent.* for prompt Payment, I deſire to know when the Debt would have been payable without the Rebate? *Anſ.* 15 *Months.*

# EQUATION *of* PAYMENTS.

*To find the equated Time for the Payment of a Sum of Money due at ſeveral Times.*

**RULE.** Find the preſent Worth of each Payment for its reſpective Time, *thus* $\frac{s}{tr+1}=P$. Add all the preſent Worths together, *then* $s-p=D$.

*and* $\frac{d}{pr}=E$.

## EXAMPLES.

1. *D* owes *E* £200. whereof £40. is to be paid at 3 Months, £60. at 6 Months, and £100 at 9 Months, at what Time may the whole Debt be paid together, Rebate being made at 5 *per Cent?* *Anſ.* 6 *Months*, 26 *Days.*

$$\frac{40}{1,0125}=39,5061. \quad \frac{60}{1,025}=58,5365 \quad \frac{100}{1,0375}=96,3855$$

*then* $200-39,5061+58,5365+96,385=5,5719$

$$\frac{5,5719}{194,4281\times,05}=,57315 = 6 \text{ Months, } 26 \text{ Days.}$$

2. *D* owes *E* £800. whereof £200. is to be paid in 3 Months, £200. at 4 Months, and £400. at 6 Months; but they agreeing to make but one Payment of the Whole, at the Rate of 5 *per Cent.* Rebate, the true equated Time is demanded? *Anſ.* 4 *Months,* 22 *Days.*

3. *E* owes *F* £1200. which is to be paid as follows: £200 down, £500. at the End of 10 Months, and the reſt at the End of 20 Months; but they agreeing to have but one Payment of the whole; Rebate at 5 *per Cent.* the true equated Time is demanded? *Anſ.* 1 *Year,* 11 *Days.*

## COMPOUND INTEREST.

**THE Letters made Uſe of in Compound Intereſt are,**

**$A$ the Amount.**
**$P$ the Principal,**
**$T$ the Time.**
**$R$ the Amount of £1. for 1 Year, at any given Rate; which is thus found.**

**As 100 : 105 : : 1 : 1,05. As 100 : 105,5 : : 1 : 1,055**

**A TABLE of the Amount of £1. for 1 Year.**

| *Rates per Cent.* | *Amts. of* £1. | *Rates per Cent.* | *Amts. of* £1. | *Rates per Cent.* | *Amts. of* £1. |
|---|---|---|---|---|---|
| 3 | 1,03 | 5½ | 1.055 | 8 | 1,08 |
| 3½ | 1,035 | 6 | 1,06 | 8½ | 1,085 |
| 4 | 1,04 | 6½ | 1,065 | 9 | 1,09 |
| 4½ | 1,045 | 7 | 1,07 | 9½ | 1,095 |
| 5 | 1,05 | 7½ | 1,075 | 10 | 1,1 |

A TABLE ſhewing the Amount of £1. for any Number of Years under 31, at 5 and 6 *per Cent. per Annum.*

| *Years.* | 5 *Rates,* | 6 | *Years.* | 5 *Rates.* | 6 |
|---|---|---|---|---|---|
| 1 | 1,05000 | 1,06000 | 16 | 2,18287 | 2,54035 |
| 2 | 1,10250 | 1,12360 | 17 | 2,29201 | 2,69277 |
| 3 | 1,15762 | 1,19101 | 18 | 2,40662 | 2,85434 |
| 4 | 1,21550 | 1,26247 | 19 | 2,52695 | 3,02559 |
| 5 | 1,27628 | 1.33822 | 20 | 2.65329 | 3.20713 |
| 6 | 1,34009 | 1,41852 | 21 | 2.78596 | 3,89956 |
| 7 | 1,40710 | 1,50363 | 22 | 2.92526 | 3;60353 |
| 8 | 1,47745 | 1,59384 | 23 | 3,07152 | 3,81975 |
| 9 | 1,55132 | 1,68948 | 24 | 3,22510 | 4,04893 |
| 10 | 1,62889 | 1.79084 | 25 | 3,38635 | 4,29187 |
| 11 | 1,71034 | 1,89829 | 26 | 3.55567 | 4.54938 |
| 12 | 1,79585 | 2,01219 | 27 | 3,73345 | 4,82234 |
| 13 | 1,88565 | 2,13292 | 28 | 3,92013 | 5,11168 |
| 14 | 1,97993 | 2,26090 | 29 | 4,11613 | 5,41838 |
| 15 | 2.07892 | 2,39655 | 30 | 4,32194 | 5,74349 |

Note, *The above Table is thus made:* As 100 : 105 : : 1 : 1,05 *for the firſt Year*; *then,* As 100 : 105 : : 1,05 : 1,1025 2*d Year,* &c.

*When* P, T, R *are given to find* A.

RULE. $p \times r^t = A$.

## EXAMPLES.

1. What will £225. amount to in 3 Years Time, at 5 *per Cent. per Annum?* *Anſ.* 1,05×1,05×1,05=1,157625. *then* 1,157625×225=£260..9..3. 3 *qrs.*

2. What will £200. amount to in 4 Years, at 5 *per Cent. per Annum?* *Anſ.* £243. 2,025 *s.*

3. What will £450. amount to in 5 Years, at 4 *per Cent. per Annum?* *Anſ.* £547..9..10. 2,0538368 *qrs.*

4. What will £500. amount to in 4 Years, at 5 ½ *per Cent. per Annum?* *Anſ.* £619..8..2. 3,8323 *qrs.*

II. *When* A, R, T *are given to find* P.

RULE. $\frac{a}{r^t} = P$.

## EXAMPLES.

1. What Principal being put to Intereſt will amount to £260..9..3. 3 *qrs.* in 3 Years, at 5 *per Cent. per Annum?*

$$1,05 \times 1,05 \times 1,05 = 1,157625. \quad \frac{260,465625}{1,157625} = £225.$$

2. What Principal being put to Intereſt will amount to £243. 2,025 *s.* in 5 Years, at 4 *per Cent. per Ann?* *Anſ.* £200.

3. What Principal will amount to £547..9..10. 2,0538368 *qrs.* in 5 Years, at 4 *per Cent. per Annum?* *Anſ.* £450.

4. What Principal will amount to £619..8..2. 3,8323 *qrs.* in 4 Years, at 5 ½ *per Cent?* *Anſ.* £500.

III. *When* P, A, T *are given to find* R.

RULE. $\frac{a}{p} = r^t$ *which being extracted by the Rules of Extraction, (the Time given to the Queſtion ſhewing the Power) will give* R.

## EXAMPLES.

1. At what Rate *per Cent.* will £225. amount to £260..9..3. *qrs.* in 3 Years?

*Anſ.* $\frac{260,465625}{225} = 1,157625.$ *(the Cube Root of which (it being the third Power)* = 1,05 = 5 *per Cent.*

2. At what Rate *per Cent.* will £200. amount to £243. 2,025 *s.* in 4 Years? *Anſ.* 5 *per Cent.*

3. At what Rate *per Cent.* will £450. amount to £547. 9..10. 2,0538368 *qrs.* in 5 Years? *Anſ.* 4 *per Cent.*

4. At what Rate *per Cent.* will £500. amount to £619. 8..2. 3,8323 *qrs.* in 4 Years? *Anſ.* 5 ½ *per Cent.*

IV. *When* P, A, R *are given to find* T.

RULE. $\frac{a}{p} = r^t.$ *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

EXAM-

## EXAMPLES.

1. In what Time will £225. amount to £260..9..3. 3 *qrs.* at 5 *per Cent?*

$$\frac{260,465625}{225} = 1,157625\ \frac{1,157625}{1,05} = 1,1025\ \frac{1,1025}{105} = 1,05\ \frac{1,05}{1,05}$$

= 1. *The Number of Diviſions being* 3 = *Time ſought.*

2. In what Time will £200. amount to £243. 2,025 *s.* at 5 *per Cent?* *Anſ.* 4 *Years.*

3. In what Time will £450. amount to £547..9..10. 2,0538368 *qrs*, at 4 *per Cent?* *Anſ.* 5 *Years.*

4. In what Time will £500. amount to £619..8..2. 38323 *qrs.* at 5 ½ *per Cent?* *Anſ.* 4 *Years.*

## ANNUITIES, *or* PENSIONS *in* ARREARS.

Note, U *repreſents the Annuity, Penſion, or yearly Rent*, A, R, T, *as before.*

A TABLE ſhewing the Amount of £1. Annuity for any Number of Years under 31, at 5 and 6 *per Cent. per Ann.*

| *Years.* | 5 *Rates.* | 6 | *Years.* | 5 *Rates.* | 6 |
|---|---|---|---|---|---|
| 1 | 1,00000 | 1,00000 | 16 | 23,65749 | 25,67252 |
| 2 | 2,05000 | 2,06000 | 17 | 25,84036 | 28,21288 |
| 3 | 3,15250 | 3,18360 | 18 | 28,13238 | 30.90565 |
| 4 | 4,31012 | 4,37461 | 19 | 30,53900 | 33.75999 |
| 5 | 5,52563 | 5,63709 | 20 | 33,06595 | 36,78559 |
| 6 | 6,80191 | 6,97532 | 21 | 35.71925 | 39,99272 |
| 7 | 8,14200 | 8,91383 | 22 | 38,50521 | 43,39229 |
| 8 | 9,54910 | 9,89746 | 23 | 41.43047 | 46,99582 |
| 9 | 11,02656 | 11,49131 | 24 | 44,50199 | 50,81557 |
| 10 | 12,57789 | 13,13079 | 25 | 47,72709 | 54,86451 |
| 11 | 14,20678 | 14,97104 | 26 | 51,11345 | 59,15638 |
| 12 | 16.91712 | 16,86994 | 27 | 54,66912 | 63,70576 |
| 13 | 17,71298 | 18,88213 | 28 | 58,40258 | 68,52811 |
| 14 | 19.59863 | 21,01505 | 29 | 62,32271 | 73,63979 |
| 15 | 21,57856 | 23,27597 | 30 | 66.48884 | 79,05818 |

Note, *The above Table is made thus, take the firſt Year's Amount, which is* £1, *multiply it by* 1,05 + 1 = 2,05 = 2*d Year's Amount, which alſo multiply by* 1,05 + 1 = 3,1525, = 3*d Year's Amount.*

I. *When* U, T, R, *are given to find* A.

RULE. $\frac{ur^t+u}{r-1}$ = A, *or by the Table thus,*

Multiply the Amount of £1. for the Number of Years, and at the Rate *per Cent.* given in the Queſtion, by the Annuity, Penſion, &c. and it will give the Anſwer.

### EXAMPLES.

1. What will an Annuity of £50. *per Annum*, payable yearly amount to in 4 Years, at 5 *per Cent ?*

*Anſ.* 1,05 × 1,05 × 1,05 × 1,05 × 50 = 60,77531250

*then* $\frac{60{,}7753125-50}{1{,}05-1}$ = £215..10..1. 2 *qrs. or by the Table.*

*thus*, 4,31012 × 50 = £215. 10..1. 1,76 *qrs.*

2. What will a Penſion of £45. *per Annum*, payable yearly, amount to in 5 Years, at 5 *per Cent ?*

*Anſ.* £248.13..0. 3,27 *qrs.*

3. If a Salary of £40. *per Annum* to be paid yearly, be forborne 6 Years, at 6 *per Cent.* what is the Amount ?

*Anſ.* £279..–.. 3,072 *d.*

4. If an Annuity of £75. *per Annum*, payable yearly, be omitted to be paid for 10 Years, at 6 *per Cent.* what is the Amount ? *Anſ.* £988..11.. 2,22*d.*

II. *When* A, T, R, *are given to find* U.

RULE. $\frac{ar-a}{r'-1}$ = U

### EXAMPLES.

1. What Annuity being forborne 4 Years, will amount to £215..10..1. 2 *qrs.* at 5 *per Cent ?*

RULE. $\frac{\overline{215{,}50625\times1{,}05}-215{,}50625}{1{,}05\times1{,}05\times{,}105\times1{,}05-1}$ = £50.

2. What Penſion being forborne 5 Years will amount to £248..13..0. 3,27 *qrs.* at 5 *per Cent?* *Anſ.* £45.

3. What Salary being omitted to be paid 6 Years, will amount to £279. –. 3,072 *d.* at 6 *per Cent?* *Anſ.* £40.

4. If the Payment of an Annuity being forborne 10 Years amount to £988..11.. 2,22 *d.* at 6 *per Cent.* what is the Annuity? *Anſ.* £75.

III. *When* U, A, R *are given to find* T.

RULE. $\frac{ar+u-a}{u}=r^t$. *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions, will be equal to* T.

### EXAMPLES.

1. In what Time will £50. *per Annum.* amount to £215..10..1. 2 *qrs.* at 5 *per Cent.* for Non-payment?

*Anſ.* $\frac{\overline{215,50625\times 1,05}+50-215,50625}{50}=1,21550625$

*which being continually divided by* R, *the Number of thoſe Diviſions will be* = 4 *Years.*

2. In what Time will £45. *per Annum* amount to £248..13..–. 3,27 *qrs.* allowing 5 *per Cent.* for Forbearance of Payment? *Anſ.* 5 *Years.*

3. In what Time will £40. *per Annum* amount to £279..–. 3,072. at 6 *per Cent?* *Anſ.* 6 *Years.*

4. In what Time will £75. *per Annum* amount to £988..11. 2,22 *d.* allowing 6 *per Cent.* for Forbearance of Payment? *Anſ.* 10 *Years.*

## PRESENT WORTH *of* ANNUITIES, PENSIONS, *&c.*

A TABLE ſhewing the preſent Worth of £1. Annuity for any Number of Years under 31, Rebate at 5 and 6 *per Cent.*

| *Years.* | 5 Rates | 6 | *Years.* | 5 Rates. | 6 |
|---|---|---|---|---|---|
| 1 | 0,93238 | 0,95238 | 16 | 10.83777 | 10,10589 |
| 2 | 1,85941 | 1,83339 | 17 | 11,27407 | 10,47726 |
| 3 | 2,72324 | 2,67301 | 18 | 11,68958 | 10,82760 |
| 4 | 3,54595 | 3,46510 | 19 | 12,08532 | 11,15811 |
| 5 | 4,32947 | 4,21236 | 20 | 12,46221 | 11,46992 |
| 6 | 5.07569 | 4,91732 | 21 | 12,82115 | 11,76407 |
| 7 | 5,78637 | 5,58238 | 22 | 13,16300 | 12,04158 |
| 8 | 6,46321 | 6,20979 | 23 | 13,48857 | 12,30338 |
| 9 | 7,10782 | 6.80169 | 24 | 13.79864 | 12,55035 |
| 10 | 7,72173 | 7,36008 | 25 | 14.09394 | 12,78335 |
| 11 | 8,30641 | 7,88687 | 26 | 14,37518 | 13,00316 |
| 12 | 8,86325 | 8,38384 | 27 | 14,64303 | 13,21053 |
| 13 | 9,39357 | 8,85268 | 28 | 14,89812 | 13,40616 |
| 14 | 9,89864 | 9,29498 | 29 | 15,14107 | 13,59072 |
| 15 | 10.37965 | 9,71225 | 30 | 15.37245 | 13,76483 |

Note, *The above Table is thus made, divide* £1. *by* 1,05 = ,95238 *the preſent Worth of the firſt Year, which* ÷ 1,05 = ,90703 *added to the firſt Year's preſent Worth* = 1,85941 *the ſecond Year's preſent Worth, then,* 90703 ÷ 1,05 *and the Quotient added to* 1,85941 = 2,72324 *the third Year's preſent Worth,* &c.

I. *When* U, T, R *are given to find* P.

RULE. $$\frac{u - \frac{u}{r^t}}{r-1} = P$$

*or, by the Table thus,*

Multiply the preſent Worth of £1. Annuity for the Time and Rate *per Cent.* given, by the Annuity, Penſion, *&c.* it will give the Anſwer.

EXAM-

## EXAMPLES.

1. What is the preſent Worth of an Annuity of £30. *per Annum*, to continue 7 Years, at 6 *per Cent?* *Anſ* £167..9.. 5,184*d.*

$$\frac{30}{1,50363}=19,9517.\quad 30-19,9517=10,0483.\ \frac{10,0483}{1,06-1}$$

$$=167,4716.\ \textit{By the Table}\ 5,58238\times 30=167,4714.$$

2. What is the preſent Worth of a Penſion of £40. *per Annum*, continue 8 Years, at 5 *per Cent?* *Anſ.* £258..10..6. 3,264 *qrs.*

3. What is the preſent Worth of a Salary of £35. to continue 7 Years, at 6 *per Cent?* *Anſ.* £195..7..7. 3,968 *qrs.*

4. What is the yearly Rent of £50. to continue 5 Years, Worth in ready Money, at 5 *per Cent?*

*Anſ.* £216..9..5. 2,56 *qrs.*

II. *When* P, T, R *are given to find*, U.

$$\text{RULE.}\ \frac{\overline{pr^t\times r-pr^t}}{r^t-1}=U.$$

## EXAMPLES.

1. If an Annuity be purchaſed for £167..9..5, 184*d.* to be continued 7 Years, at 6 *per Cent.* what is the Annuity?

$$\textit{Anſ.}\ \frac{\overline{167,4716\times 1,50363\times 1,06-167,4716\times 1,50363}}{1,50363-1}=£30$$

2. If the preſent Payment of £258..10..6 3,264 *qrs.* be made for a Salary 8 Years to come, at 5 *per Cent.* what was the Salary? *Anſ* £40.

3. If the preſent Payment of £195..7..7. 3,968 *qrs.* were required for a Penſion for 7 Years to come, at 6 *per Cent.* what is the Penſion? *Anſ.* £35.

4. If the preſent Worth of an Annuity, 5 Years to come, be £216. 9..5. 2,56 *qrs.* at 5 *per Cent.* what is that Annuity? *Anſ.* £50.

III. *When* U, P, T *are given to find* T.

RULE. $\frac{u}{p+u-pr}=r^t$ *which being continually divided by* R *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

## EXAMPLES.

1. How long will a Leaſe of £30. yearly Rent be had for £167..9..5. 184*d.* allowing 6 *per Cent.* to the Purchaſer?

*Anſ.* $\frac{30}{167,4716+30-177,5198}=1,50363$ *which being continually divided, the Number of thoſe Diviſions will be* $=$ *to* T.

2. If 258..10..6. 3,264 *qrs.* is paid down for a Leaſe of £40. *per Annum,* at 5 *per Cent.* how long is the Leaſe purchaſed for? *Anſ.* 8 *Years.*

3. If an Houſe is let upon Leaſe for £35. *per Annum* and the Leſſee makes preſent Payment of £195..7..8. he being allowed 6 *per Cent.* I demand how long the Leaſe is purchaſed for? *Anſ.* 7 *Years.*

4. For what Time may a Leaſe of £50. *per Annum,* be purchaſed, when preſent Payment is made of £216. 9. 5. 2,56 *qrs.* at 5 *per Cent?* *Anſ.* 5 *Years.*

## ANNUITIES, LEASES, *&c.* *taken in* REVERSION.

### *To find the preſent Worth of Annuities, Leaſes, &c. taken in Reverſion.*

RULE 1. Find the preſent Worth of the Annuity, *&c.* at the given Rate and for the Time of its Continuance; *thus.*

$$\frac{u-\frac{u}{r^t}}{r-1}=P.$$

Change P into A, and find what Principal being put to Intereſt will amount to P at the ſame Rate, and for the Time to come, before the Annuity commences, which will be the preſent Worth of the Annuity, *&c. thus,*

$$\frac{a}{r^t}=P.$$

### EXAMPLES.

1. What is the preſent Worth of a Reverſion of a Leaſe of £40 *per Annum*, to continue 6 Years, but not to commence till the End of two Years, allowing 6 *per Cent.* to the Purchaſer? *Anſ.* £175..1..1. 2,048 *qrs.*

$$\frac{40}{1,41852}=28,1984.\quad\frac{40-28,1984}{1,06-1}=196,6932\quad\frac{196,6933}{1,1236}=175,0563$$

2. What is the preſent Worth of a Reverſion of a Leaſe of £60 *per Annum*, to continue 7 Years, but not to commence till the End of 3 Years, allowing 5 *per Cent.* to the Purchaſer? *Anſ.* £299..18. 2,4*d.*

3. There is a Leaſe of a Houſe of £30 *per Annum*, which is yet in being for 4 Years, and the Leſſee is deſirous to take a Leaſe in Reverſion for 7 Years, to begin when the old Leaſe ſhall be expired, what will be the preſent Worth of the ſaid Leaſe in Reverſion, allowing 5 *per Cent.* to the Purchaſer? *Anſ.* £142..16. 3. 2,688 *qrs.*

*To find the yearly Income of an Annuity, &c. taken in Reverſion.*

RULE. Find the amount of the preſent Worth, at the given Rate, and for the Time before the Annuity commences; *thus,*

$$pr^t = A$$

Change A into P, and find what yearly Rent being ſold, will produce P. at the ſame Rate, and for the Time of its Continuance, which will be the yearly Sum required. *thus,*

$$\frac{prt \times r - pr^t}{pr^t - 1} = U.$$

### EXAMPLES.

1. What Annuity to be entered upon 2 Years hence, and then to continue 6 Years, may be purchaſed for £175..1..1. 2,048 *qrs.* ready Money, at 6 *per Cent.*?

*Anſ.* $175,0563 \times 1,1236 = 196,6933$

*then,* $$\frac{196,6933 \times 1,41852 \times 1,06 - 279,01337}{1,41852-1} = £40$$

2. The preſent Worth of a Leaſe of an Houſe is £299..18..2.4*d.* taken in Reverſion for 7 Years, but not to commence till the End of 3 Years, allowing 5 *per Cent.* to the Purchaſer, what is the yearly Rent? *Anſ.* £60.

3. There is a Leaſe of an Houſe in being for 4 Years, and the Leſſee being minded to take a Leaſe in Reverſion for 7 Years, to begin when the old Leaſe ſhall be expired, paid down £142..16..3. 2,688 *qrs.* what was the yearly Rent of the Houſe, when the Leſſee was allowed 5 *per Cent.* for preſent Payment? *Anſ.* £30.

## PURCHASING FREEHOLD *or* REAL ESTATES.

Is ſuch as is bought to continue for ever.

*When* U, R *are given to find* W.

RULE. $\dfrac{u}{r-1} = W$

EXAMPLES.

1. What is the Worth of a Freehold Eſtate of £50 *per Annum*, allowing 5 *per Cent.* to the Buyer?

*Anſ.* $\dfrac{50}{1{,}05-1} = £1000$

2. What is an Eſtate of £140. *per Annum*, to continue for ever, worth in preſent Money, allowing 4 *per Cent.* to the Buyer? *Anſ.* £3500.

3. If a Freehold Eſtate of £75. yearly Rent were to be ſold, what is it worth, allowing the Buyer 6 *per Cent.*? *Anſ.* £1250.

II. *When* W, R *are given to find* U.

RULE. $w \times \overline{r-1} = U.$

EXAMPLES.

1. If a Freehold Eſtate is bought for £1000. and the Allowance of 5 *per Cent.* is made to the Buyer, what is the yearly Rent? *Anſ.* $1{,}05-1 = {,}05$. *then* $1000 \times {,}05 = £50$.

2. If an Eſtate be ſold for £3500. and 4 *per Cent.* allowed to the Buyer, what is the yearly Rent? *Anſ.* £140.

3. If a Freehold Eſtate is bought for £1250. preſent Money, and an Allowance of 6 *per Cent.* made to the Buyer for the ſame, what is the yearly Rent? *Anſ.* £75.

III. *When* W, U, *are given to find* R.

RULE. $\dfrac{w+u}{w} = R.$

### EXAMPLES.

1. If an Eſtate of £50 *per Annum.* is bought for £1000, what is the Rate *per Cent.*?

$$Anſ.\ \frac{1000+50}{1000}=1,05=5\ per\ Cent.$$

2. If a Freehold Eſtate of £140 *per Annum* be bought for £3500. what was the Rate *per Cent.* allowed? *Anſ.* 4 *per Cent.*

3. If an Eſtate of £75 *per Annum* is ſold for £1250. what is the Rate *per Cent.* allowed? *Anſ.* 6 *per Cent.*

## *Purchaſing* FREEHOLD ESTATES *in* REVERSION.

### *To find the Worth of a Freehold Eſtate in Reverſion.*

RULE. Find the Worth of the yearly Rent, *thus,* $\frac{u}{r-1}=W.$

Change W into A, and find what Principal being put to Intereſt, will amount to A at the ſame Rate, and for the Time to come, before the Eſtate commences, and that will be the Worth of the Eſtate in Reverſion *thus,* $\frac{a}{r^t}=P.$

### EXAMPLES.

1. If a Freehold Eſtate of £50 *per Annum*, to commence 4 Years hence, is to be ſold, what is it worth, allowing the Purchaſer 5 *per Cent.* for preſent Payment?

$$Anſ.\ \frac{50}{1,05-1}=1000.\ then,\ \frac{1000}{1,2155}=£822..14.\ 1.\ 2\ qrs. +$$

2. What is an Eſtate of £200. to continue for ever, but not to commence till the End of 2 Years, worth in ready Money, allowing the Purchaſer 4 *per Cent.*

*Anſ.* £4622..15*s.* 7*d.* 44 *qrs.*

3. What is an Eſtate of £240. *per Annum*, worth in ready Money, to continue for ever, but not to commence till the End of 3 Years, Allowance being made at 6 *per Cent.*?

*Anſ.* £3358..9 .10. 2,24 *qrs.*

### *To find the yearly Rent of an Eſtate taken in Reverſion.*

RULE. Find the Amount of the Worth of the Eſtate, at the given Rate and Time before it commences, *thus,* $wr^t=A.$

Change A into W, and find what yearly Rent being ſold will produce U, at the ſame Rate, *thus,* $\frac{awr\times-wr}{r}=U.$

which will be the yearly Rent required.

### EXAMPLES.

If a Freehold Eſtate, to commence 4 Years hence, is ſold for £822. 14..1. 2 *qrs.* allowing the Purchaſer 5 *per Cent.* what is the yearly Income? *Anſ* $822{,}70625 \times 1{,}2155 = 1000.$

*then* $$\frac{1000 \times 1{,}05 \times 1{,}05 - 1050}{1{,}05} = £50.$$

2. A Freehold Eſtate, is bought for £4622..15. 7,44*d.* which does not commence till the End of 2 Years, the Buyer being allowed 4 *per Cent.* for his Money, I deſire to know the yearly Income? *Anſ.* £200.

3. There is a Freehold Eſtate ſold for £3358..9. 10. 2,24 *qrs.* but not to commence till the Expiration of 3 Years, allowing 6 *per Cent.* for preſent Payment, what is the yearly Income? *Anſ.* £240.

## REBATE *or* DISCOUNT.

A TABLE ſhewing the preſent Worth of £1. due at any Number of Years, to commence under 31, Rebate at 5 and 6 *per Cent.*

| *Years.* | ,5 *Rates.* | 6 | *Years.* | 5 *Rates.* | 6 |
|---|---|---|---|---|---|
| 1 | ,952381 | ,943396 | 16 | ,458111 | ,393647 |
| 2 | ,907030 | ,889996 | 17 | ,436296 | ,371364 |
| 3 | ,863838 | ,839619 | 18 | ,415520 | ,350343 |
| 4 | ,822702 | ,792093 | 19 | ,395734 | ,330513 |
| 5 | ,783526 | ,747258 | 20 | ,376889 | ,311804 |
| 6 | ,746215 | ,704960 | 21 | ,358942 | ,294155 |
| 7 | ,710682 | ,665057 | 22 | ,341849 | ,277505 |
| 8 | ,676839 | ,627412 | 23 | ,325571 | ,261797 |
| 9 | ,644609 | ,591898 | 24 | ,310067 | ,246978 |
| 10 | ,613913 | ,558394 | 25 | ,295302 | ,232998 |
| 11 | ,584679 | ,526787 | 26 | ,281240 | ,219810 |
| 12 | ,556837 | ,496969 | 27 | ,267848 | ,207368 |
| 13 | ,530321 | ,468839 | 28 | ,255093 | ,195630 |
| 14 | ,505068 | ,442301 | 29 | ,242946 | ,184556 |
| 15 | ,481017 | ,417265 | 30 | ,231377 | ,174110 |

Note, *The above Table is made thus:* $1 \div 1{,}05 = 952381$ *firſt Year's preſent Worth, and* $,952381 \div 1{,}05 = ,90703$ *ſecond Year, and* $,90703 \div 1{,}05 = ,863838$ *third Year,* &c.

7. *When* S, T, R *are given to find* P.

RULE. $\frac{s}{rt}=$ P.

EXAMPLES.

1. What is the preſent Worth of £315 .. 12 .. 4. 2 *qrs.* payable 4 Years hence at 6 *per Cent?*

*Anſ.* 1,06×1,06×1,06×1,06=1,26247. *then, by the Table.*

$$\frac{315,6175}{1,26247}=250. \qquad \begin{array}{r} 315,6175 \\ ,792093 \\ \hline 249,9984124275 \end{array}$$

2. If £344..14..9. 1,92 *qrs.* be payable in 7 Years Time, what is the preſent Worth, Rebate being made at 5 *per Cent?*

*Anſ.* £245.

3. There is a Debt of £441 .. 17 .. 3. 192 *qrs.* which is payable 4 Years hence, but it is agreed to be paid in preſent Money, what Sum muſt the Creditor receive, Rebate being made at 6 *per Cent?* *Anſ.* £350

II. *When* P, T, R *are given to find* S.

RULE. $p\times rt=$ S

EXAMPLES.

1. If a Sum of Money due 4 Years hence produce £250. for the preſent Payment, Rebate being made at 6 *per Cent.* what was the Sum firſt due? *Anſ.* 250×1,26247=£315..12..4,2,

2. If £245. be received for a Debt payable 7 Years hence, and an Allowance of 5 *per Cent.* to the Debtor for preſent Payment, what was the Debt? *Anſ.* £344..14..9. 1,92 *qrs.*

3. There is a Sum of Money due at the Expiration of 4 Years, but the Creditor agrees to take £350. for preſent Payment, allowing 6 *per Cent.* what was the Debt?

*Anſ.* £441 .. 17 .. 3. 1,92 *qrs.*

III. *When* S, P, R *are given to find* T.

RULE. $\frac{s}{p}=rt.$ *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

### EXAMPLES.

1. The preſent Payment of £250. is made for a Debt of £315..12.. 4,2*d.* Rebate at 6 *per Cent.* in what Time was the Debt payable ?

*Anſ.* $\frac{315,6175}{250}=1,26247$ *which being continually divided, thoſe Diviſions will be equal to* 4 = *the Number of Years.*

2. A Perſon receives £245. now for a Debt of £344..14.. 9. 1,92 *qrs.* Rebate being made at 5 *per Cent.* I demand in what Time the Debt was payabe ? *Anſ.* 7 *Years.*

3. There is a Debt of £441..17..3. 1,92 *qrs* due at a certain Time to come, but 6 *per Cent.* being allowed to the Debtor for the preſent Payment of £350. I deſire to know in what Time the Sum ſhould have been made without any Rebate ? *Anſ.* 4 *Years.*

IV. *When* S, P, T *are given to find* R.

RULE. $\frac{s}{p}=r^t$ *which being extracted by the Rules of Extraction, (the Time given in the Queſtion, ſhewing the Power,) will be equal to* R.

### EXAMPLES.

1. A Debt of £315 .12..4. 2*d.* is due 4 Years hence, but it is agreed to take £250. now, what is the Rate *per Cent.* that the Rebate is made at ?

*Anſ.* $\frac{315,6175}{250}=1,26247$ ; $\sqrt[4]{1,26247}=1,06=6$ *per Cent.*

2. The preſent Worth of £344..14..9. 1,92 *qrs.* payable 7 Years hence, is £245. at what Rate *per Cent.* is Rebate made ? *Anſ.* 5 *per Cent.*

3. There is a Debt of 441..17..3. 1,92 *qrs.* payable in 4 Years Time, but it is agreed to take £350. preſent Payment, I deſire to know at what Rate *per Cent.* Rebate is made at ? *Anſ.* 6 *per Cent.*

# THE
# TUTOR's ASSISTANT.

## PART IV.

## DUODECIMALS:

Or, what is generally called *Croſs Multiplication*, and *Squaring of Dimenſions by Artificers and Workmen.*

### RULES *for multiplying* DUODECIMALLY.

1. UNDER the Multiplicand write the correſponding Denominations of the Multiplier.

2. Multiply each Term in the Multiplicand (beginning at the loweſt) by the Feet in the Multiplier; write each Reſult under its reſpective Term, obſerving to carry an Unit for every 12, from each lower Denomination to its next Superior.

3. In the ſame Manner multiply the Multiplicand by the Primes in the Multiplier, and write the Reſult of each Term one Place more to the right Hand of thoſe in the Multiplicand.

4. Work in the ſame Manner with the Seconds in the Multiplier, ſetting the Reſult of each Term two Places to the Right-Hand of thoſe in the Multiplicand, and ſo on for Thirds, Fourths, &c.

## EXAMPLES.

*f. in f. in.*
1. Multiply 7. 9 by 3. 6
by *Croſs Multiplication.*

$$\begin{array}{l} 7 \times 9 \\ 3 \;\; 6 \\ \hline 21..\;--=7\times 3 \\ 2.\;3\;-=9\times 3 \\ 3..\;6\;-=7\times 6 \\ -..\;4\;.6=9\times 6 \\ \hline 27..\;1..6 \end{array}$$

*By Practice.*

$$\begin{array}{l} 6\;\tfrac{1}{2}\;\;7..\;9 \\ \qquad\quad 3.\;6. \\ \hline 23..\;\;3 \\ 3..\;\;10..\;6 \\ \hline 27..\;\;1.\;\;6 \end{array}$$

*By Duodecimals.*

$$\begin{array}{l} 7..\;\;9 \\ 3.\;\;6 \\ \hline 23..\;\;3 \qquad \times 3 \\ \;\;3..10 \quad 6\times 6 \\ \hline 27..\;\;1..6 \end{array}$$

*Decimals.*

$$\begin{array}{l} 7{,}75 \\ 3{,}5 \\ \hline 3875 \\ 2325 \\ \hline 27{,}125=27..\;1..\;6. \end{array}$$

| | | *f. in.* | | *f. in.* | | *f. in.* |
|---|---|---|---|---|---|---|
| 2. | Multiply | 8. 5. | by | 4. 7. | *Facit* | 38. 6. 11 |
| 3. | Multiply | 9. 8. | by | 7. 6. | *Facit* | 72. 6. |
| 4. | Multiply | 8. 1. | by | 3. 5. | *Facit* | 27. 7. 5 |
| 5. | Multiply | 7. 6. | by | 5. 9. | *Facit* | 43. 1. 6 |
| 6. | Multiply | 4. 7. | by | 3. 10. | *Facit* | 17. 6.10'' '''' |
| 7. | Multiply | 7. 5 9'' | by | 3. 5. 3'' | *Facit* | 25. 8. 6.2.3 |
| 8. | Multiply | 10. 4 5 | by | 7. 8. 6 | *Facit* | 79. 11. 0.6.6 |
| 9. | Multiply | 75. 7. | by | 9. 8. | *Facit* | 730. 7. 8. |
| 10. | Multiply | 97. 8. | by | 8. 9. | *Facit* | 854. 7. |
| 11. | Multiply | 57. 9. | by | 9. 5. | *Facit* | 543. 9. 9. |
| 12. | Multiply | 75. 9. | by | 17. 7. | *Facit* | 1331. 11. 3. |
| 13. | Multiply | 87. 5. | by | 35. 8. | *Facit* | 3117. 10. 4. |
| 14. | Multiply | 179. 3. | by | 38.10. | *Facit* | 6960. 10. 6. |
| 15. | Multiply | 259. 2. | by | 48. 11. | *Facit* | 12677. 6.10. |
| 16. | Multiply | 257. 9. | by | 39.11. | *Facit* | 10288. 6. 3''' '''' |
| 17. | Multiply | 311. 4 7. | by | 36. 7. 5. | *Facit* | 11402 2.4.11.11 |
| 18. | Multiply | 321. 7.3. | by | 9. 3. 6. | *Facit* | 2988. 2.10.4. 6. |

### *The* APPLICATION.

Artificers Work are computed by different Meaſures, *viz.*

1. *Glazing* and *Maſons Flatwork* by the Foot.
2. *Painting*, *Plaiſtering*, *Paving*, &c. by the Yard.
3. *Partitioning*, *Flooring*, *Rooſing*, *Tyling*, &c. by the Square 100 Feet.

4. *Brickwork*, &c. by the Rod of 16 Feet $\frac{1}{2}$, whoſe Square is 272 $\frac{1}{4}$.

### MEASURING *by the* FOOT SQUARE *as* GLAZIERS, *and* MASONS *Flatwork.*

#### EXAMPLES.

1. There is a Houſe with 3 Tier of Windows, 3 in a Tier, the Height of the firſt Tier 7 Feet 10 Inches, the ſecond 6 Feet 8 Inches, and the third 5 Feet 4 Inches, the Breadth of each is 3 Feet 11 Inches, what will the Glazing come to at 14 *d. per* Foot?

*Duodecimals.*

7 .. 10 *the*
6 .. 8 *Heights*
5 .. 4 *added*
19 .. 10
3 = *Windows*
59 .. 6 *in a Tier.*
3 .. 11. *in Breadth.*
178 .. 6
54 .. 6 .. 6
233 .. — .. 6

233 .. — .. 6 *at* 14 *d. per Foot.*
2*d.* $\frac{1}{6}$ 233 .. — .. — = 1 *s.*
38 .. 10 .. — = 2 *d.*
— .. — .. $\frac{1}{2}$ = 6 *Parts.*
2|0) 27|1 .. 10 $\frac{1}{2}$
£13 .. 11 .. 10 $\frac{1}{2}$ *Anſ.*

2. What is the Worth of 8 Panes of Glaſs, each meaſuring 4 Feet 10 Inches long, and 2 Feet 11 Inches broad, at 4*d.* $\frac{1}{8}$ *per* Foot? *Anſ.* £1 .. 18 .. 9.

3. There are 8 Windows to be glazed each meaſures 1 Foot 6 Inches wide, and 3 Feet in Height, how much will they come to at 7 *d.* $\frac{3}{4}$ *per* Foot? *Anſ.* £1 .. 3 .. 3.

4. What is the Price of a Marble Slab whoſe Length is 5 Feet 7 Inches, and the Breadth 1 Foot 10 Inches, at 6 *s. per* Foot? *Anſ.* £3 .. 1 .. 5.

### MEASURING *by the* YARD SQUARE, *as* PAVIORS, PAINTERS, PLAISTERERS, *and* JOINERS.

Note, *Divide the Square Feet by* 9, *and it will give the Number of Square Yards.*

#### EXAMPLES

5. A Room is to be cieled, whoſe Length is 74 Feet 9 Inches, and Width 11 Feet 6 Inches, what will it come to at 3 *s.* 10 *d.* $\frac{1}{2}$ *per* Yard? *Anſ.* £18 .. 10 .. 1.

6. What will the Paving of a Court-yard come to, at 4 *d.* $\frac{3}{4}$ *per* Yard, the Length being 58 Feet 6 Inches, and Breadth 54 Feet 9 Inches? *Anſ.* £7 .. – .. 10.

7. A Room painted 97 Feet 9 Inches about, and 9 Feet 10 Inches high, what does it come to at 2 *s.* 8 *d.* $\frac{3}{4}$ *per* Yard? *Anſ.* £14 .. 11 .. 1.

8. What is the Content of a Piece of Wainſcotting in Yards Square, that is 8 Feet 3 Inches long, and 6 Feet 6 Inches broad, and what will it come to at 6 *s.* 7 *d.* $\frac{1}{2}$ *per* Yard? *Anſ.* £1 .. 19 .. 5 $\frac{1}{4}$.

9. What will the Paving a Court-yard come to at 3 *s.* 2 *d.* *per* Yard, if the Length be 27 Feet 10 Inches, and the Breadth 14 Feet 9 Inches? *Anſ.* £7 .. 4 .. 5.

10. A Perſon has paved a Court-yard 42 Feet 9 Inches in Front, and 68 Feet 6 Inches in Depth, and in this he laid a Foot-way the Depth of the Court, of 5 Feet 6 Inches in Breadth: The Foot-way is laid with Purbeck Stone, at 3 *s.* 6 *d.* *per* Yard, and the reſt with Pebbles, at 3 *s.* *per* Yard, what will the whole come to? *Anſ.* £49 .. 17 .. – $\frac{1}{2}$.

11. What will the Plaiſtering, a Cieling, at 10 *d.* *per* Yard, come to, ſuppoſing the Length 21 Feet 8 Inches, and the Breadth 14 Feet 10 Inches? *Anſ.* £1 .. 9 .. 8 . $\frac{3}{4}$.

12. What will the Wainſcotting a Room come to, at 6 *s.* *per* Square Yard, ſuppoſing the Heighth of the Room, (taking in the Cornice and Moulding) is 12 Feet 6 Inches, and the Compaſs 83 Feet 8 Inches, the 3 Window Shutters each 7 Feet 8 Inches, by 3 Feet 6 Inches, and the Door 7 Feet by 3 Feet 6 Inches, the Shutters and Door, being worked on both Sides, is reckoned Work and Half Work? *Anſ.* £36 .. 12 .. 2 $\frac{1}{2}$

## MEASURING *by the* SQUARE *of* 100 *Feet as* FLOORING, PARTITIONING, ROOFING, TYLING, &c.

### EXAMPLES.

13. In 173 Feet 10 Inches in Length, and 10 Feet 7 Inches in Height of Partitioning, how many Squares? *Anſ.* 18 *Squares*, 39 *Feet*, 8 *inches*, 10 *P.*

14. If a Houſe of 3 Stories beſides the Ground Floor, was to be floored at £6 .. 10 .. –. *per* Square, and the Houſe meaſures 20 Feet 8 Inches, by 16 Feet 9 Inches, there are 7 Fire Places, whoſe meaſure are two of 6 Feet, by 4 Feet 6 Inches each, two of 6 Feet by 5 Feet 4 Inches each, and two of 5 Feet 8 Inches, by 4 Feet 8 Inches, and the ſeventh of 5 Feet 2 Inches, by 4 Feet, and the Well-hole for the Stairs

is 10 Feet 6 Inches, by 8 Feet 9 Inches, what will the Whole come to? *Anſ.* £53 .. 13 .. 3. ¼.

15. If a Houſe meaſures within the Walls 52 Feet 8 Inches in Length, and 30 Feet 6 Inches in Breadth, and the Roof be of a true Pitch, what will it come to roofing, at 10 *s.* 6 *d. per* Square? *Anſ.* 12 .. 12 .. 11. ¾.

Note, *in Tyling, Roofing, and Slating, it is cuſtomary to reckon the Flat, and Half of any Building within the Wall, to be the Meaſure of the Roof of that Building, when the ſaid Roof is of a true Pitch,* i. e. *when the Rafters are ¾ of the Breadth of the Building; but if the Roof is more or leſs than the true Pitch, they meaſure from one Side to the other, with a Rod or String.*

16. What will the Tyling of a Barn coſt, at 25*s.* 6*d. per* Square, the Length being 43 Feet 10 Inches, and Breadth 27 Feet 5 Inches on the Flat, the Eave Boards projecting 16 Inches on each Side? *Anſ.* £24 . 9 .. 5. ½.

### MEASURING *by the* ROD.

Note, *Bricklayers always value their Work at the Rate of a Brick and a Half thick, and if the Thickneſs of the Wall is more or leſs, it muſt be reduced to that Thickneſs by this*

RULE. Multiply the Area of the Wall by the Number of Half-bricks the Thickneſs of the Wall is of; the Product, divided by 3, gives the Area.

### EXAMPLES.

17. If the Area of a Wall be 4085 Feet, and the Thickneſs two Bricks and a Half thick, how many Rods doth it contain? *Anſ.* 25.

18. If a Garden Wall be 254 Feet round, and 12 Feet 7 Inches high, and 3 Bricks thick, how many Rods doth it contain? *Anſ.* 23 *Rods*, 178 *Feet.*

19. How many Square Rods are there in a Wall 62 ½ Feet long, 14 Feet 8 inches high, and 2 ½ Bricks thick? *Anſ.* 5 *Rods*, 167 *Feet.*

20. If the Side Walls of an Houſe be 28 Feet 10 Inches in Length, and the Heighth of the Roof from the Ground 53 Feet 8 Inches, and the Gable (or triangular Part at Top) to riſe 42 Courſe of Bricks (reckoning 4 Courſe to a Foot). Now, 20 Feet high is 2 ½ Brick thick, 20 Feet more, at 2 Bricks thick, 15 Feet 8 Inches more, at 1 ½ Brick thick, and the Gable at 1 Brick thick, what will the whole Work come to, at £5 .. 16 ..–. *per* Rod? *Anſ.* £48 .. 13 .. 5. ¼

*Mul.*

### *Multiplying ſeveral Figures by ſeveral, and the Product to be produced in one Line only.*

RULE. Multiply the Units of the Multiplicand by the Units of the Multiplier, ſetting down the Units of the Product, and carry the Tens; next multiply the Tens in the Multiplicand by the Units of the Multiplier, to which add the Product of the Units of the Multiplicand multiplied by the Tens in the Multiplier, and the Tens carried; then multiply the Hundreds in the Multiplicand by the Units of the Multiplier, adding the Product of the Tens in the Multiplicand multiplied by the Tens in the Multiplier, and the Units of the Multiplicand by the Hundreds in the Multiplier; and ſo proceed till you have multiplied the multiplicand all through, by every Figure in the Multiplier.

### EXAMPLES.

```
Multiply - - 35234              35234
      by - - 52424              52424
        ----------            -------
        1847107216             140936
        ----------             70468
                             140936
                             70468
                           176170
                           ----------
                           1847107216
```

### EXAMPLES.

*Firſt*, $4\times4=16$, that is, 6 and carry 1. *Second*, $3\times4+4\times2$, and 1 that was carried is 21, ſet down 1 and carry 2. *Thirdly*, $2\times4+3\times2+4\times4+2$ carried $=32$, that is, 2 and carry 3. *Fourthly*, $5\times4+2\times2+3\times4+4\times2+3$ carried $=47$, ſet down 7 and carry 4. *Fifthly*, $3\times4+5\times2+2\times4+3\times2+4\times5+4$ carried $=60$, ſet down 0 and carry 6. *Sixthly*, $3\times2+5\times4+2\times2+3\times5+6$ carried $=51$, ſet down 1 and carry 5. *Seventhly*, $3\times4+5\times2+2\times5+5$ carried $=37$, that is 7 and carry 3. *Eighthly*, $3\times2+5\times5+3$ carried $=34$, ſet down 4, and carry 3. *Laſtly*, $3\times5+3$ carried $=18$ which being multiplied by the laſt Figure in the Multiplier, ſet the whole down, and the Work is finiſhed.

THE

# THE

# TUTOR's ASSISTANT.

## PART V.

*A Collection of* QUESTIONS *ſet down promiſcuouſly, for the greater Trial of the foregoing* RULES.

WRITE down two Millions, five Hundred and two Thouſand, two Hundred and five.

2. What is the Value of 14 Barrels of Soap, at 4*d.* ½ *per lb.* each Barrel containing 254 *lb.*?

*Anſ.* £66 .. 13 .. 6.

3. If £100. Principal gain £5. Intereſt in 12 Months, what Principal will gain £20. in 8 Months?

*Anſ.* £600.

4. What Number is that from which, if the Square of 14 is deducted, and to the Remainder the Square of 12 be added, the Sum will be 250? *Anſ.* 302.

5. *A* and *B* trade together; *A* put in £320. for 5 Months, *B* £460. for 3 Months, and they gained £100. what muſt each Man receive? *Anſ.* A £53 .. 13 .. 9. $\frac{270}{298}$ *and* B £46 .. 6 .. 2. $\frac{28}{298}$.

6. How many Yards of Cloth, at 17*s.* 6*d. per* Yard, can I have for 13 *cwt.* 2 *qrs.* of Wool, at 14*d. per lb.*?

*Anſ.* 100 *Yards.* 3 *qrs.* $\frac{1}{5}$.

7. What Number added to the Cube of 21, will make the Sum equal to 113 Times 147? *Anſ.* 7350.

8. If I buy 1000 Ells of *Flemiſh* Linen for £90. what may I ſell it at *per* Ell in *London*, to gain £10 by the Whole?

*Anſ.* 3*s.* 4*d. per Ell.*

9. *A* has 648 Yards of Cloth, at 14*s. per* Yard, ready Money, but in Barter will have 16*s.* *B.* has Wine at £42. *per* Tun, ready Money, the Queſtion is how much Wine muſt be given for the Cloth, and what is the Price of a Tun of Wine in Barter? *Anſ.* £48. *the Tun, and* 10 *Tun* 3 *Hogſheads,* 12 *Gallons of Wine muſt be given for the Cloth.*

10. A Jeweller ſold Jewels to the Value of £1200. for which he received in Part 876 *French* Piſtols, at 16*s.* 6*d.* each, what Sum remains unpaid? *Anſ.* £477 .. 6 ..—.

11. An Oilman bought 417 *cwt.* 1 *qr.* 15 *lb.* Groſs Weight of Train Oil, Tare 20 *lb. per* 112 *lb.* how many neat Gallons were there, allowing 7 $\frac{1}{2}$ *lb.* to a Gallon ? *Anſ.* 5120 *Gallons.*

12. Bought threeſcore Pieces of Holland for three Times as many Pounds, and ſold them again for 4 Times as much but if they had coſt me as much as I ſold them for, what ſhould I have ſold them for to gain after the ſame Rate ?
*Anſ.* £320.

13. What Number taken from the Square of 54 will leave 19 Times 46 ? *Anſ.* 2042.

14. If I buy a Yard of Cloth for 14 *s.* 6 *d.* and ſell it for 16 *s.* 9 *d.* what do I gain *per Cent ?* *Anſ.* £15 .. 10 .. 4. $\frac{24}{174}$.

15. Bought 27 Bags of Ginger, each weighing. Groſs 84 *lb.* $\frac{3}{4}$, Tare 1 *lb.* $\frac{3}{8}$ *per* Bag, Trett, 4 *lb. per* 104 *lb.* what do they come to at 8 *d.* $\frac{1}{2}$ *per lb. ?* *Anſ.* £76 .. 13 .. 3. [illegible].

16. If $\frac{2}{3}$ of an Ounce coſt $\frac{7}{8}$ of a Shilling, what will $\frac{5}{6}$ *lb.* coſt ? *Anſ.* 17 *s.* 6 *d.*

17. If $\frac{5}{6}$ of a Gallon coſt $\frac{5}{8}$ of a £. what will $\frac{5}{9}$ of a Tun coſt ? *Anſ.* £105.

18. A young Man received £210. which was $\frac{2}{3}$ of his elder Brother's Portion ; now three Times the elder Brother's Portion was Half of the Father's Eſtate, I demand how much the Eſtate was ? *Anſ* £1890,

19. If the Salary of an Officer be £48,5 *per Annum*, what muſt he receive for 232 Days ? *Anſ.* £30 .. 16 .. 6. 2 *qrs.*

20. A Gentleman ſpends, one Day with another £1..7..10 $\frac{1}{2}$, and at the Year's End layeth up £340. what is his yearly Income ? *Anſ* £848 .. 14 .. 4. $\frac{1}{2}$.

21. A Lady's Fortune conſiſted of a Cabinet, worth £200. containing 16 Drawers, each having two Partitions, each of which contained £37. and two Crowns, pray what was her Portion ? *Anſ.* £1400.

22. *A* has 13 Fother of Lead to ſend Abroad, each being 19 $\frac{1}{2}$ Times 112 *lb.* *B* has 39 Caſks of Tin, each 388 *lb.* how many Ounces Difference is there in the Weight of theſe Commodities ? *Anſ.* 212160.

23. A Captain and 160 Sailors took a Prize worth £1360. of which the Captain had $\frac{1}{5}$ for his Share, and the reſt was equally divided among the Sailors, what was each Man's Part? *Anſ. The Captain had* £272. *and each Sailor* £6 .. 16 ..—.

24. What Number is that, to which if you add 7 $\frac{1}{3}$, the Whole will be 12 $\frac{1}{4}$ ? *Anſ.* 4 $\frac{11}{12}$.

25. A Uſurer put out £75. for 12 Months, and received for Principal and Intereſt, £81. I demand at what Rate *per Cent.* he received Intereſt ? *Anſ.* £8 *per Cent.*

26. Wha

26. What will £956. amount to in 7 ½ Years, at 5 *per Cent.* Simple Intereſt? *Anſ.* £1314 .. 10 .. –.

27. At what Rate *per Cent* will £956 amount to £1314. 10 *s.* in 7 ½ Years, at Simple Intereſt? *Anſ.* 5 *per Cent.*

28. If for £1 .. 4.–. I have 1200 *lb.* Weight carried 36 Miles, how many *lb.* Weight can I have carried 24 Miles for the ſame Money? *Anſ.* 1800 *lb.*

29. If 8 Cannons in one Day ſpend 48 Barrels of Powder, I demand how many Barrels 24 Cannons will ſpend in 22 Days? *Anſ.* 3168.

30. What Number is that, which being multiplied by ⅔, will produce ¼? *Anſ.* ⅜.

31. *A* has 24 Cows worth 72 *s.* each, and *B* 7 Horſes worth £10 a piece, how much will make good the Difference, in Caſe they interchange their ſaid Drove of Cattle? *Anſ.* £4 .. 12–.

32. A Man dies and leaves £120. to be given to 3 Perſons, *viz.* *A*, *B*, and *C*; to *A* a Share unknown; *B* twice as much as *A*, and *C* as much as *A* and *B*, what was the Share of each? *Anſ.* A £20. B £40. *and* C 60.

33. A Perſon dying, left his Widow £1780. and £1250. to each of his four Children; he had been 25 ½ Years in Trade, and had cleared (at an Average) £126. a Year, what had he, to begin with? *Anſ.* £3567.

34. There is a Sum of £1000. to be divided among 3 Men, in ſuch Manner, that if *A* has £3. *B* ſhall have 5. and C £8. how much muſt each Man have?
*Anſ.* A £ 187 .. 10 .. –. B £312 .. 10 .. –. *and* C £500.

35. A Piece of Wainſcot is 8 Foot 6 Inches and ½ long, and 2 Foot 9 Inches ¾ broad, what is the Superficial Content? *Anſ.* 24 Feet 0 .. 3″ .. 4 .. 6.

36. How many Changes may be rung on 6 Bells? *Anſ.* 720.

37. A Merchant at *Amſterdam* is indebted to another in *London*, in £642. and would pay it in *Spaniſh* Guilders, at 2*s.* *per* Piece, how many muſt the *Engliſh* Merchant receive? *Anſ.* 6420.

38. If 360 Men be in Garriſon, and have Proviſion for 6 Months; but hearing of no Relief at the End of 5 Months, how many Men muſt depart, that the Proviſions may laſt ſo much longer? *Anſ.* 288.

39. The leſs of two Numbers is 187, their Difference 34, the Square of the Product is required? *Anſ.* 1707920929.

40. A Butcher ſends his Man with £216. to a Fair to buy Cattle; Oxen at £11. Cows at 40 *s.* Colts at £1 .. 5 .. –. and Hogs at £1 .. 15 .. –. *per* Piece, and of each a like Number,

how many of each Sort did he buy ?

*Anſ.* 13 *of each Sort, and* £8. *over.*

41. What Number added to 11 $\frac{5}{7}$ will produce 36 $\frac{337}{616}$.

*Anſ.* 24 $\frac{513}{616}$.

42. What Number multiplied by $\frac{3}{7}$ will produce 11 [illegible].

*Anſ.* 26 $\frac{40}{51}$.

43. A Man had 12 Sons, the youngeſt was 3 Years old, and the eldeſt 58; they increaſed in Arithmetical Progreſſion, what was the common Difference of their Ages ? *Anſ.* 5 *Years.*

44. What is the Value of 179 Hogſheads of Tobacco, each weighing 13 *cwt.* at £2..7..1. *per cwt ?* *Anſ.* £5478..2..11.

45. My Factor ſends me Word he has bought Goods to the Value of £500..13..6. upon my Account, what will his Commiſſion come to at 3 $\frac{1}{2}$ *per Cent ?* *Anſ.* £17..10..5. 2 *qrs.* $\frac{68}{100}$

46. Miſs *Kitty* told her Siſter *Charlotte*, whoſe Father had before left them £13200. a piece ; that their Grandmother by Will had raiſed her Fortune to £15000. and had made her own £20,000. what did the old Lady leave them ? *Anſ.* £8600.

47. A Snail in getting up a May Pole, only 20 Feet high, was obſerved to climb 8 Feet every Day, but every Night he came down again 4 Feet ; in what Time, by this Method, did he reach the Top of the Pole ? *Anſ.* 4 *Days.*

48. If the $\frac{1}{3}$ of 6 be 3, what will $\frac{1}{4}$ of 20 be ? *Anſ.* 7 $\frac{1}{2}$.

49. What is the Difference between 14676, and the Fourth of itſelf ? *Anſ.* 11007.

50. There is in 3 Bags the Sum of £1468. *viz.* in the firſt Bag £461. in the ſecond £581. what was in the third Bag ?

*Anſ.* £426.

51. What is the Decimal of 3*qrs.* 14*lb.* of an *cwt.* ? *Anſ.* 875.

52. How many *lb.* of Sugar, at 4 *d.* $\frac{1}{2}$ *per lb.* muſt be given in Barter for 60 Groſs of Incle, at 8 *s.* 8 *d.* *per Groſs ?*

*Anſ.* 1386 . $\frac{2}{3}$

53. If I buy Yarn for 9 *d.* the *lb.* and ſell it again for 13 *d.* $\frac{1}{2}$ *per lb.* what is the Gain *per Cent ?* *Anſ.* £50.

54. A Tobacconiſt would mix 20 *lb.* of Tobacco, at 9 *d per lb.* with 60 *lb.* at 12 *d.* *per lb.* 40 *lb.* at 18 *d.* the *lb.* and with 12 *lb.* at 2 *s.* *per lb.* what is a *lb.* of this Mixture worth ?

*Anſ.* 1*s.* 2 *d.* $\frac{1}{4}$ $\frac{9}{11}$.

55. What is the Value of 14 Barrels of Soap, at 4 *d.* $\frac{1}{2}$ *per lb.* each Barrel, containing 254 *lb ?* *Anſ.* £66 .. 13 . 6.

56. Two Perſons, *A* and *B*, owe ſeveral Debts ; the leſſer Debt being that of *A*, is £2173. the Difference is £371 what is the Debt of *B ?* *Anſ.* £2544.

57. What is the Difference between twice eight and twenty

and twice twenty eight: As alſo, between twice five and fifty, and twice fifty five? *Anſ.* 20. *and* 50.

58. What Number taken from the Square of 54 will leave 19 Times 46? *Anſ.* 2042.

59. A School-maſter being aſked how many Scholars he had, ſaid, if I had as many more, half as many, and 1 Quarter as many, I ſhould have 99, how many had he? *Anſ.* 36.

60. An ancient Lady being aſked how old ſhe was, to avoid a direct Anſwer, ſaid, I have 9 Children, and there are 3 Years between the Birth of each of them, the eldeſt was born when I was 19 Years old, which is now exactly the Age of the Youngeſt, how old was the Lady? *Anſ.* 62 *Years old.*

61. What Number is that which being added to 168 makes the Sum to be 706? *Anſ.* 538.

62. From £100. borrowed take 72 paid,
'Twas a Virgin that lent it, what's due to the Maid?
*Anſ.* £28.

63. If when Wheat is 4 *s. per* Buſhel, the 20 Penny Loaf weighs 18 *lb.* what muſt the ſaid 20 Penny Loaf weigh, when Wheat is 6 *s.* the Buſhel? *Anſ.* 12 *lb.*

64. Whereas a Noble and a Mark juſt 15 Yards did buy,
How many Ells of the ſame Cloth for £50. had I?
*Anſ.* 600.

65. A Broker bought for his Principal in the Year 1720. £400. Capital Stock in the South Sea at £650. *per Cent.* and ſold it again when it was worth but 130 *per Cent.* how much was loſt in the whole? *Anſ.* £2080.

66. What Number added to the 43d Part of 4429, will make the Sum 240? *Anſ.* 137.

67. What Number deducted from the 26th Part of 2262 will leave the 87th Part of the ſame? *Anſ.* 61.

68. A Gentleman went to Sea at 17 Years of Age, 8 Years after that he had a Son born who lived 46 Years, and died before his Father, after whom the Father lived twice 20 Years, and then died alſo, what was the Age of the Father when he died? *Anſ.* 111 Years.

69. *C* hath Candles at 6 *s. per* Dozen ready Money, but in Barter will have 6 *s.* 6 *d. per* Dozen, *D* hath Cotton at 9 *d. per lb.* ready Money, I demand what Price the Cotton muſt be at in Barter, alſo how much Cotton muſt be bartered for 100 Doz. of Candles? *Anſ. the Cotton* 9*d.* 3 *qrs. per lb. and* 7 *cwt.* 0 *qrs.* 16 *lb. of Cotton muſt be given for* 100 *Doz. of Candles.*

70. The Sum of two Numbers is 360, the leſs 114 what is their Difference, Product and larger Quote?
*Anſ.* 132 *Diff.* 28044 *Product*, 2 $\frac{3}{19}$ *Quote.*

71. A Brigade of Horſe conſiſting of 384 Men is to be formed into a Square Body, having 32 Men in Front, how many Ranks will there be? *Anſ.* 12.

72. If a Clerk's Salary be £73. a Year, what is that *per* Day? *Anſ.* 4 *s.*

73. *B* hath an Eſtate of £53. *per Annum*, and payeth 5 *s.* 10 *d.* to the Subſidy, what muſt *C* pay, whoſe Eſtate is worth £100 *per Annum?* *Anſ.* 11 *s.* 0 *d.* $\frac{4}{53}$.

74. If I buy 100 Yards of Ribband at 3 Yards for a Shilling and 100 more at 2 Yards for a Shilling, and ſell it at the Rate of 5 Yards for 2 Shillings, whether do I get or loſe, and how much? *Anſ. loſe* 3 *s.* 4 *d.*

75. What is the Value of $\frac{5}{8}$ of 20 *s*? *Anſ.* 12 *s.* 6 *d.*

76. What Number is that, which if you take $\frac{3}{5}$, the Remainder will be $\frac{1}{8}$. *Anſ.* $\frac{29}{40}$.

77. My Purſe and Money, quoth *Dick*, are worth 12 *s.* 8 *d.* but the Money is worth 7 of the Purſe, pray what is the Sum therein? *Anſ.* 11 *s.* 1 *d.*

78. What Number is that which maketh 9 to be the $\frac{2}{3}$ of it? *Anſ.* 13 $\frac{1}{2}$.

79. A Malſter has ſeveral Sorts of Malt, one at 4 *s.* 6 *d.* another at 4 *s.* and a third at 3 *s.* 6 *d.* a Buſhel; to mix an equal Quantity of each, what muſt be the Price of a Buſhel? *Anſ.* 4 *s.*

80. A Farmer is willing to make a Mixture of Rye at 4 *s.* a Buſhel, Barley at 3 *s.* and Oats at 2 *s.* how much muſt he take of each to ſell it at 2 *s.* 6 *d.* the Buſhel?
*Anſ.* 6 *of Rye*, 6 *of Barley, and* 24 *of Oat*

81. If $\frac{3}{8}$ of a Ship be worth £3740. what is the Worth of the Whole? *Anſ.* £9973 .. 6 .. 8.

82. A Perſon ſaid he had 20 Children, and that it happened there was a Year and a half between each of their Ages, his eldeſt was born when he was 24 Years old, and the Age of his youngeſt is 21, what was the Father's Age? *Anſ.* 73$\frac{1}{2}$ *Years.*

83. Bought a Caſk of Wine for £62 .. 8 .. –. how many Gallons were in the ſame, when a Gallon was valued at 5 *s.* 4 *d.* *Anſ.* 234.

84. *B* owes *C* £296 .. 17 .. –. but he compounds for 7 *s.* 6 *d.* in the Pound, what muſt *C* receive for his Debt? *Anſ.* £111 .. 6 .. 4. $\frac{1}{2}$.

85. How many Dozen of Stockings at 11 Groats *per* Pair, may I buy for £190 .. 12 .. –.? *Anſ.* 86 *Doz.* 7 *Pair* $\frac{28}{44}$.

86. A Sheepfold was robbed 3 Nights ſucceſſively; the laſt Night half the Sheep were ſtolen, and half a Sheep more;

the ſecond Night half of the Remainder were loſt, and half a Sheep more; the laſt Night they took half that were left, and half a Sheep more; by which Time they were reduſed to 20; how many were they at firſt? *Anſ.* 167.

87. The Spectator's Club of fat People, tho' it conſiſted but of 15 Perſons, is ſaid to weigh no leſs than 3 Tons, how much, at an Equality, was that *per* Man? *Anſ.* 4 *cwt.*

88. A merry young Fellow in a ſmall Time got the better of $\frac{1}{5}$ of his Fortune; by Advice of his Friends, he gave £2200 for an Exempt's Place in the Guards; his Profuſion continued till he had no more than 880 Guineas left, which he found by Computation was $\frac{3}{20}$ Part of his Money, after the Commiſſion was bought, pray what was his Fortune at firſt? *Anſ.* £10450.

89. *B* owes C £395 .. 18 ..–. but compounds the whole Debt for £100 .. 12 ..–. what is that in the Pound? *Anſ.* 5 *s* 0 *d* $\frac{1}{2}$ $\frac{7746}{7918}$.

90. How many Dollars, at 4 *s.* 4 *d.* each muſt be given for 360 Guilders, at 2 *s.* 2 *d.* each? *Anſ.* £180.

91. Four Men have a Sum of Money to be divided amongſt them in ſuch a Manner, that the firſt ſhall have $\frac{1}{3}$ of it, the ſecond $\frac{1}{4}$, the third $\frac{1}{6}$, and the fourth the Remainder, which is 28, what is the Sum? *Anſ.* £112.

92. What is the Amount of £1000. for 5 Years $\frac{1}{2}$, at 4 $\frac{3}{4}$ *per Cent.* Simple Intereſt? *Anſ.* £1261 .. 5 .. –.

93 Sold Goods amounting to the Value of £700. for 2 4 Months, what is the preſent Worth, at 5 *per Cent.* Simple Intereſt? *Anſ.* £682 .. 19 .. 5. 2 *qrs.*

94. A Room is 30 Foot long, and 18 Feet wide, is to be covered with painted Cloth, how many Yards of $\frac{3}{4}$ wide will cover it? *Anſ.* 80 *Yards.*

95. There are two Numbers, the one 48, the other twice as much, what is the Difference between their Sum and Difference? *Anſ.* 96.

96. *Hetty* told her Brother *George*, that tho' her Fortune on her Marriage took £19312. out of her Family, it was but $\frac{3}{5}$ of two Years Rent, Heaven be praiſed! of his yearly Income, pray what was that? *Anſ* £ 16093 .. 6 .. 8. *a Year.*

97. There are two Numbers, the one 25, the other the Square of 25, I demand the Square Root of the Sum of their Squares? *Anſ.* 625,4998.

98. Says *B* to *C*, if I had 4 of your Sheep, I ſhould have as many as you, and ſays C to *B*, if I had 4 of yours, I ſhould have twice as many as you; how many had each? *Anſ.* B 20, C 28.

99. *B*, *C* and *D* trading together gained £120. which is
o be ſhared according to each Man's Stock; *B* put in £140.
£300. and *D* £160. what is each Man's Share?
*Anſ.* B £28. C £60. D £32.

100. A Gentleman having 50 *s.* to pay amongſt his La-
ourers for a Day's Work, would give to every Boy 6 *d.* to
very Woman 8 *d.* and to every Man 16 *d.* the Number of
oys, Women and Men, was the ſame, I demand the Num-
er of each? *Anſ.* 20 *of each Sort.*

101. There are 3 Numbers, 17, 19, and 48, I demand
he Difference between the Sum of the Squares of the firſt
nd laſt, and the Cube of the Middlemoſt? *Anſ.* 4266.

102. A Stone that meaſures 4 Feet 6 Inches long, 2 Feet
Inches broad, and 3 Feet 4 Inches deep, how many ſolid
eet doth it contain? *Anſ.* 41 *Feet* 3 *Inches.*

103. What does the whole Pay of a Man of War's Crew
f 640 Sailors amount to for 32 Months Service, each Man's
ay being 22 *s.* 6 *d.* *per* Month? *Anſ.* £23040.

104. If I have an Eſtate of £470. *per Annum*, what may
expend daily, and yet lay up £130. *per Annum*?
*Anſ.* 18 *s.* 7 *d.* $\frac{1}{2}\ \frac{190}{365}$.

105, What Number is that, which being divided by 19,
he Quotient will be 72? *Anſ.* 1368.

106. Reduce 13 ½ Buſhels of Coals to the Fraction of a
haldron. *Facit* $\frac{3}{8}$.

107. Bought 28 *qrs.* 2 Buſhels of Wheat at 4 *s.* 6 *d.* *per*
uſhel, what does it come to? *Anſ.* £50 .. 17 ..–.

108. How many Pounds of Coffee at 5 *s.* 9 *d.* *per lb.* is
qual in Value to 426 *lb.* of Tea at 13 *s.* 4 *d.* *per lb.*?
*Anſ.* 987 $\frac{57}{69}$.

109. What is the Value of 27 Dozen 10 *lb.* of Candles
t 5 *d.* *per lb.*? *Anſ.* £6 .. 19 .. 2.

110. A Traveller would change 500 *French* Crowns at 4 *s.*
*d.* *per* Crown into *Sterling* Money, but he muſt pay a Half-
enny *per* Crown for Change, how much muſt he receive?
*Anſ.* £111 .. 9 .. 2.

111. There are two Numbers, the one 63, and the other
as much, I demand the Product of their Squares, and the
ifference of their Product and Sum?
*Anſ. Product of their Squares* 3938240,25, *Difference* 1890.

112. *B* and *C* traded together and gained £100. *B* put in
640. *C* put in ſo much, that he might receive £60. of the
ain. I demand how much *C* put in? *Anſ.* £960.

113. Of what Principal Sum did £20. Intereſt ariſe in 1 Year, at the Rate of 5 *per Cent. per Annum?* *Anſ.* £400.

114. Having bought 40 Yards of Cloth, at 8 *s. per* Yard, and 70 Yards at 12 *s.* what is the Value of both Pieces? *Anſ.* £58.

115. Two Men depart both from one Place, the one goes North, and the other South; the one goes 7 Miles, and the other 11 Miles a Day, how far are they diſtant the 12th Day of their Departure? *Anſ.* 216 *Miles.*

116. In 672 *Spaniſh* Guilders, how many *French* Piſtoles at 17 *s.* 6 *d per* Piece? *Anſ.* 76 $\frac{28}{35}$.

117. In 7 Cheeſes, each weighing 1 *cwt.* 2 *qrs.* 5 *lb.* how many Allowances for Seamen may be cut, each weighing 5 *oz.* 7 *dr.*? *Anſ.* 2563 $\frac{33}{87}$.

118. If 48 taken from 120 leave 72, and 72 taken from 91 leave 19, and 7 taken from thence leave 12, what Number is that, out of which, when you have taken 48, 72 19 and 7, leaves 12? *Anſ.* 158.

119. A Farmer ignorant in Numbers, ordered £500. to be divided among his 5 Sons, thus. Give *A*, ſays he, $\frac{1}{3}$, *B* $\frac{1}{4}$, *C* $\frac{1}{5}$, *D* $\frac{1}{6}$, and *E* $\frac{1}{7}$ Part, divide this equitable among them, according to the Father's Intention. *Anſ.* A £152 $\frac{1392}{2754}$. B £114 $\frac{1044}{2754}$. C £91 $\frac{1386}{2754}$. D £76 $\frac{696}{2754}$. *and* E £65 $\frac{96}{2754}$.

120. When firſt the Marriage Knot was ty'd,
Between my Wiſe and me,
Her Age did mine as far exceed,
As three Times three does three.
But when ſeven Years, and half ſeven Years,
We Man and Wife had been,
My Age came then as near to her's,
As Eight is to Sixteen.

*Queſt.* What was each of our Ages when we married?
*Anſ.* 10 $\frac{1}{2}$ *Years the Man*, 31 $\frac{1}{2}$ *the Woman.*

121. If 12 Oxen will eat 3 $\frac{1}{3}$ Acres of Graſs in 4 Weeks, and 21 Oxen will eat 10 Acres in 9 Weeks, how many Oxen will eat 24 Acres in 18 Weeks, the Graſs being allowed to grow uniformly? *Anſ.* 36.

122. A Lady was aſked her Age who reply'd thus,
My Age if multiplied by three,
Two Sevenths of that Product tripled be,
The Square Root of two Ninths of that is four;
Now tell my Age or never ſee me more.

*Anſ.* 28 *Years.*

A TABLE

## A TABLE for finding the INTEREST of any Sum of Money for any Number of Months, Weeks or Days, at any Rate per Cent.

| Year. | Kalendar Month. | | | Week. | | | Day. | | |
|---|---|---|---|---|---|---|---|---|---|
| £. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
| 1 | — | 1 | 8 | — | — | 4½ | — | — | —½ |
| 2 | — | 3 | 4 | — | — | 9— | — | — | 1¼ |
| 3 | — | 5 | — | — | 1 | 1¾ | — | — | 2— |
| 4 | — | 6 | 8 | — | 1 | 6¼ | — | — | 2½ |
| 5 | — | 8 | 4 | — | 1 | 11— | — | — | 3¼ |
| 6 | — | 10 | — | — | 2 | 3¾ | — | — | 3¾ |
| 7 | — | 11 | 8 | — | 2 | 8¼ | — | — | 4½ |
| 8 | — | 13 | 4 | — | 3 | —¾ | — | — | 5½ |
| 9 | — | 15 | — | — | 3 | 5½ | — | — | 5¾ |
| 10 | — | 16 | 8 | — | 3 | 10— | — | — | 6½ |
| 20 | 1 | 13 | 4 | — | 7 | 8¼ | — | 1 | 1— |
| 30 | 2 | 10 | — | — | 11 | 6¼ | — | 1 | 7¾ |
| 40 | 3 | 6 | 8 | — | 15 | 4½ | — | 2 | 2¼ |
| 50 | 4 | 3 | 4 | — | 19 | 2¾ | — | 2 | 8¾ |
| 60 | 5 | — | — | 1 | 3 | —¾ | — | 3 | 3¼ |
| 70 | 5 | 16 | 8 | 1 | 6 | 11— | — | 3 | 10— |
| 80 | 6 | 13 | 4 | 1 | 10 | 9— | — | 4 | 4½ |
| 90 | 7 | 10 | — | 1 | 14 | 7¼ | — | 4 | 11¼ |
| 100 | 8 | 6 | 8 | 1 | 18 | 5½ | — | 5 | 5¾ |
| 200 | 16 | 13 | 4 | 3 | 16 | 11— | — | 10 | 11½ |
| 300 | 25 | — | — | 5 | 15 | 4½ | — | 16 | 5¼ |
| 400 | 33 | 6 | 8 | 7 | 13 | 10— | 1 | 1 | 11— |
| 500 | 41 | 13 | 4 | 9 | 12 | 3½ | 1 | 7 | 4¾ |
| 600 | 50 | — | — | 11 | 10 | 9— | 1 | 12 | 10½ |
| 700 | 58 | 6 | 8 | 13 | 9 | 2¾ | 1 | 18 | 4¼ |
| 800 | 66 | 13 | 4 | 15 | 7 | 8¼ | 2 | 3 | 10— |
| 900 | 75 | — | — | 17 | 6 | 1¾ | 2 | 9 | 3¾ |
| 1000 | 83 | 6 | 8 | 19 | 4 | 7¼ | 2 | 14 | 9½ |
| 2000 | 166 | 13 | 4 | 38 | 9 | 2¾ | 5 | 9 | 7— |
| 3000 | 250 | — | — | 57 | 13 | 10— | 8 | 4 | 4½ |
| 4000 | 333 | 6 | 8 | 76 | 18 | 5½ | 10 | 19 | 2— |
| 5000 | 416 | 13 | 4 | 96 | 3 | —¾ | 13 | 13 | 11½ |
| 6000 | 500 | — | — | 115 | 7 | 8¼ | 16 | 8 | 9— |
| 7000 | 583 | 6 | 8 | 134 | 12 | 3½ | 19 | 3 | 6½ |
| 8000 | 666 | 13 | 4 | 153 | 16 | 11— | 21 | 18 | 4¼ |
| 9000 | 750 | — | — | 173 | 1 | 6¼ | 24 | 13 | 1¾ |
| 10,000 | 833 | 6 | 8 | 192 | 6 | 1¾ | 27 | 7 | 11¼ |
| 20,000 | 1666 | 13 | 4 | 314 | 12 | 3½ | 54 | 15 | 10½ |
| 30,000 | 2500 | — | — | 576 | 18 | 5½ | 82 | 3 | 10— |

RULE, Multiply the Principal by the Rate per Cent. and the Number of Months, Weeks, or Days which is required, cut off two Figures on the Right-hand Side of the Product, and collect from the Table the ſeveral Sums againſt the Different Numbers as when added, will make the Number remaining. Add the ſeveral Sums together it will give the Intereſt required. N. B. For every 10 that is cut off in Months, add 2d, for every 10 cut off in Weeks add an Halfpenny, and for every 40 in the Days one Farthing.

## EXAMPLES.

1. What is the Intereſt of £2467..10..–. for 10 Months, at 4 *per Cent. per Annum?*

2467..10
4
9870 .—
10
987|00

900=75..—..–
80= 6..13..4
7= –..11..8
987=82..5..–

2 What is the Intereſt of £2467..10–. for 12 Weeks, at 5 *per Cent.*

2467. 10
5
12337..10
12
1480|50..—

1000=19.. 4.. 7 ¼
400= 7..13..10
80= 1..10.. 6
–..—.. 2 ½
1480=28.. 9.. 4 ¾

3. What is the Intereſt of £2467..10..–. for 50 Days, at 6 *per Cent.*

2467..10
6
14805..—
50
7402|50

7000=19..3 . 6 ½
400= 1..1 .11
2=—..–.. 1 ¼
—..–..— ¼
7402=20..5..7

To find what any Eſtate from £1 £60,000 *per Annum* will come to for 1 Day.

RULE. Collect the annual Rent or Income from the Table for a Year, againſt which take the ſeveral Sums for one Day, add them together it will give the Anſwer.

An Eſtate of £376 *per Annum*, what is that *per* Day.

300=—..16..5 [illegible]
70=—..3..10
6=—..—..3 ¾
376=1..—..7

To find the Amount of any Income, Salary, or Servant's Wages, for any Number of Months, Weeks, or Days.

**Rule.** Multiply the yearly Income or Salary by the Number of Months, Weeks, or Days, and collect the Product of the Table.

What will £270. *per Annum* come to for 11 Months, for 3 Weeks, and for 6 Days?

*For 11 Months.*

```
 270    2000 = 166..13..4
  11     900 =  74.. –.. –
 ----     70 =   5..16..8
2970    ------------------
        2970 = 247..10.. –
```

*For 3 Weeks.*

```
270    800 = 15.. 7.. 8¼
  3     10 =  –.. 3..10
---    ----------------
810 =        15..11.. 6¼
```

*For 6 Days.*

```
 270    1000 = 2..14.. 9½
   6     600 = 1..12..10½
 ----     20 = –.. 1.. 1
1620    ------------------
        1620 = 4.. 8.. 9
```

*For the whole Time.*

```
247..10.. –
 15..11.. 6¼
  4.. 8.. 9
-----------
267..10.. 3¼
```

**A Table** ſhewing the Number of Days from any Day in one Month to the ſame Day in any other Month, through the Year.

| | From January. | | February. | | March. | | April. | | May. | | June. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feb. | 31 | March | 28 | April | 31 | May | 30 | June | 31 | July. | 30 |
| | March | 59 | April | 59 | May | 61 | June | 61 | July | 61 | Aug. | 61 |
| | April | 90 | May | 89 | June | 92 | July | 91 | Aug. | 92 | Sept. | 92 |
| | May | 120 | June | 120 | July | 122 | Aug. | 122 | Sept | 123 | Oct. | 122 |
| | June | 151 | July | 150 | Aug. | 153 | Sept. | 153 | Oct. | 153 | Nov. | 153 |
| To | July | 181 | Aug. | 181 | Sept. | 184 | Oct. | 183 | Nov. | 184 | Dec. | 182 |
| | Aug. | 212 | Sept. | 212 | Oct. | 214 | Nov. | 214 | Dec. | 218 | Jan. | 214 |
| | Sept | 243 | Oct. | 242 | Nov. | 245 | Dec. | 244 | Jan. | 245 | Feb. | 245 |
| | Oct. | 273 | Nov. | 273 | Dec. | 275 | Jan. | 275 | Feb. | 276 | Mar. | 273 |
| | Nov. | 304 | Dec. | 303 | Jan. | 306 | Feb. | 306 | Mar. | 304 | April | 304 |
| | Dec. | 334 | Jan. | 334 | Feb. | 337 | Mar. | 334 | April | 335 | May | 334 |
| | Jan. | 365 | Feb. | 365 | Mar. | 365 | April | 365 | May | 365 | June | 365 |
| | From July. | | Auguſt. | | September | | October. | | November | | December. | |
| | Aug. | 31 | Sept. | 31 | Oct. | 30 | Nov. | 31 | Dec. | 30 | Jan. | 31 |
| | Sept. | 62 | Oct. | 61 | Nov. | 61 | Dec. | 61 | Jan. | 61 | Feb. | 62 |
| | Oct. | 92 | Nov. | 92 | Dec. | 91 | Jan. | 92 | Feb. | 92 | Mar. | 90 |
| | Nov. | 123 | Dec. | 122 | Jan. | 122 | Feb. | 123 | Mar. | 120 | April | 121 |
| | Dec. | 153 | Jan. | 153 | Feb. | 153 | Mar. | 151 | April | 151 | May | 151 |
| To | Jan. | 184 | Feb. | 184 | Mar. | 181 | April | 182 | May | 181 | June | 182 |
| | Feb. | 215 | Mar. | 212 | April | 212 | May | 212 | June | 212 | July | 212 |
| | Mar. | 243 | April | 243 | May | 242 | June | 243 | July | 242 | Aug. | 243 |
| | April | 274 | May | 273 | June | 273 | July | 273 | Aug. | 273 | Sept. | 274 |
| | May | 304 | June | 304 | July | 303 | Aug. | 304 | Sept. | 304 | Oct. | 304 |
| | June | 335 | July | 334 | Aug. | 334 | Sept. | 335 | Oct. | 334 | Nov. | 335 |
| | July | 365 | Aug. | 365 | Sept. | 365 | Oct. | 365 | Nov. | 365 | Dec. | 365 |

FINIS.